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Europe (12 issues)	£100	£100
Rest of world (12 issues)	£125	£125

What do you think of this issue of PC Advisor? We welcome feedback - email Jim Martin at jim_martin@pcadvisor.co.uk and include the issue number in the subject heading



PC Advisor is published by IDG UK
 IDG UK, 101 Euston Road, London NW1 2RA. Tel: 020 7756 2800
 Printer: Wyndeham Press Group Ltd 01621 877 777
 Distribution: Seymour Distribution Ltd 020 7429 4000

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JIM
MARTIN



The Surface 3 is here

Microsoft's new tablet has plenty going for it

Welcome to another packed issue of *PC Advisor*. Microsoft surprised many by launching a new Surface tablet. Not quite the Surface Mini that everyone expected, but a slightly smaller and more affordable Surface Pro 3. Called the Surface 3, it's not as powerful as the Pro version, but still has plenty going for it. Whether or not you agree with us that it's better than a laptop because of its ability to be used as a tablet as well as with a keyboard for productivity, you'll find the full review on page 33.

The news which is less likely to have escaped you is the slow shift to 4K, or Ultra HD, monitors. As with TVs, 4K PC monitors are steadily arriving. They have four times more pixels than so-called Full HD screens, so can display considerably more detail in photos and games as well as producing a crisper-looking Windows desktop. We've compared the latest models on page 78: they're not as expensive as you might imagine.

When you buy a new laptop or PC off the shelf, chances are that it's loaded with extra software. Some might consider this a bonus, but anti-virus trials, shortcuts to websites and services are generally there to make money for the computer manufacturer instead of for your benefit.

However, it tends to take up valuable hard disk space as well as causing your new machine to be slower to start up. We explain how to get rid of this 'bloatware' on page 88. And on the subject of freeing up wasted storage, you'll find out how to find and delete duplicate files if you turn to page 100.

Those looking for a new phone will find all the latest models, starting on page 42 with the excellent LG G4. It might seem very similar to last year's G3 at first glance, but it has a few upgrades you're bound to appreciate especially if a good camera is a priority.

In the next issue we'll compare nine of the best phone cameras, including the G4, to find out which is best for photos and videos. Plus, as Microsoft has just announced that Windows 10 will be released on 29 July, we'll have our full review of the new operating system, so don't miss it.

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Microsoft reveals Windows 10 will be available on 29 July

Windows 7 or 8.1 users can sign up for a 'reservation' now to be among the first to download the OS

The wait is over: Microsoft has announced that you'll be able to download Windows 10 on 29 July, especially if you sign up for a 'reservation' on Windows 7 and 8.1 systems.

On that date, the company says you'll either be able to download the new operating system or buy a new Windows 10 PC from retailers. And if you click the reservation link that Microsoft is pushing via its most recent updates to Windows 7 and 8.1, you can sign up to preload the software just as soon as it becomes available.

Don't expect Windows 10 Mobile to be available on that date, though. In a footnote to a blog post announcing the date, the tech giant says the date applies to PCs and tablets only. Microsoft also hasn't specified that the 29 July date applies to both the Windows 10 Home and the Professional versions, though we assume both are included.

Terry Myerson, corporate vice president in charge of Microsoft's operating system development has said that Windows 10 will be a free upgrade, and that like the ongoing security updates the company provides, will be "free for the supported lifetime of your device". The tech giant didn't define what the "supported lifetime" of those PCs will be, though.

Does this matter? Obviously, we've all been waiting for the release date, but this information meant a lot more in previous years, when Microsoft reserved the testing of its new operating system to a select few, and its features remained a mystery right up until the launch.

With Microsoft's open public testing, that mystery has disappeared. Moreover, the company's commitment to continued updates after Windows 10 is available also means that the July launch is a moment in time, rather than the final steps in a long road of product development.



What you get in Windows 10

Microsoft's Myerson ran down the list of Windows 10's signature features, which include: Cortana; its new Edge browser; the Xbox app and integrated Xbox Live service for PCs; Windows Hello, its biometric login service; the Windows Continuum transition between PC and tablet; and the Windows Store. He specifically highlighted Maps, Photos, Mail and Calendar, Music, and Video, as integrated apps that will complement the core user experience.

Windows 10 users will also be able to download the touch-friendly versions of Word, PowerPoint and Excel that the company showed off earlier. Myerson's blog post also reveals that versions of Outlook and OneNote will ship with Windows 10 at no additional cost.

Does that mean that Newegg, which posted a story claiming that Windows 10 will be available in stores at the end of August, was mistaken? Not necessarily. It's possible

that Microsoft will ship a finished copy to stores a month after it sends the same version to retailers. The company is set to charge \$119 for the Home Edition and \$199 for the Professional Edition. At the time of writing, UK pricing had not been announced.

How to reserve Windows 10 on Windows 7 and 8.1

If you're worried about being unable to download Windows 10 on 29 July, don't be. For one, you can always join the Windows Insider program, allowing you to download a preview copy of the operating system and try out its new features as they're tweaked and polished ahead of the launch.

Otherwise, you should be receiving a pop-up notification that's triggered by the latest updates to Windows 7 and 8.1. You'll have the option of clicking on this to trigger the reservation process and ensure that your system downloads the Windows 10 update, which will be free for up to a year after it launches. Interestingly, the updates will also scan your PC and alert you to any possible problems that you might have - such as incompatible hardware or services.

Once you've completed the process, relax. You'll have a brand new copy of Windows 10 running on your PC on the day it launches.

You can join the Windows Insider program, allowing you to download a preview copy of Windows 10 and try out its new features as they're tweaked and polished ahead of the launch

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AMD goes after the Core i3 with its Godavari chip

CHRIS MARTIN



AMD calls it 'a cheap, effective choice for building PCs designed for online gaming'

What's referred to as the 'Godavari' chip represents a slight bump in terms of the CPU and GPU clock speed compared to the existing A10-7850K, which uses AMD's existing Kaveri architecture. PCs featuring this chip are available to buy now.

Like the A10-7850K, Godavari uses 12 computer cores (4 CPU, 8 GPU), but boosts the core CPU clock from 3.7- to 3.9GHz, and turbo speeds from 4- to 4.1GHz. AMD has also sped up the graphics chip from 720- to 866MHz. It uses AMD's existing FM2+ motherboard socket ecosystem, however, which makes it a relatively inexpensive upgrade.

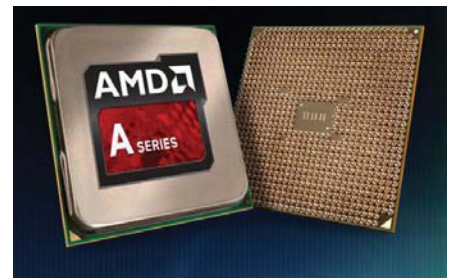
That's a marginal speed increase, though, across the board, and AMD isn't making any claims about attacking the high end of the APU market. Instead, the company is positioning the chip against a combination of an Intel Core i3 and an nVidia GeForce GT 740 discrete GPU. At 1080p 'max' settings, AMD is claiming frame rates of 35fps for

StarCraft 2, 49fps for DOTA 2, and 89fps for a 5x5 League of Legends match.

AMD also says that the APU can power Dirt Rally at 1920x1080, medium settings, at about 40fps. Naturally, AMD still recommends a discrete graphics card; pairing it with a Radeon R7 250, for example, ekes out 45fps or so on High settings.

"AMD takes a major step forward today by unveiling the world's most advanced eSports and online gaming processor technology in the A10-7870K APU," said Matt Skynner, corporate vice president and general manager of the Computing and Graphics Business Unit at AMD, in a statement. He positioned the APU as the economy choice, "giving players the ability to game like a pro without spending like one."

The chip supports AMD-specific technologies, including Virtual Screen Resolution for gaming at lower resolutions. Not surprisingly, the chip supports DirectX 12 (and Windows 10), Vulkan, and AMD's own



Mantle API, which will bump framerates further on supported games.

The new chip appears to be a half-hearted effort, given the current computing landscape; we'd doubt that this will do much to render The Witcher III, for instance. But this is AMD's legacy: cost-effective, unobtrusive APUs that provide decent performance at decent prices. For something more aggressively competitive, you'll have to wait for the Zen core in 2016. Look for the next-generation AMD 'Carrizo' notebook chips in the near future, too.

Intel launches Broadwell-H chips for desktops and laptops

Intel rolls out the latest members of its fifth-generation Core line-up - Broadwell-H

Intel has announced 10 new Broadwell-H chips, known as the Intel Core i7-5xxx family. Most include the new Intel Iris Pro graphics 6200 core, which the company claims offers graphics gains of up to twice those of the prior-generation Core i7-4790S chips.

In some sense, the Broadwell-H chips bridge the gap between the fifth-generation Core chips, whose manufacturing problems delayed them for months. That's produced a traffic jam of sorts, with the next-generation Skylake chips due by the end of the year.

Intel's Broadwell-H chips could prove to be interestingly timed for Intel, given that they'll launch about the same time as Microsoft's Windows 10. The problem is, they're not the chips Intel wants to sell, because the Skylake processor embodies Intel's next-generation

future of wire-free computing. But it's the chip that's available now, and this the one that consumers and hardware makers will seek to alleviate months of pent-up demand, especially in the desktop market.

Ten new processors will be part of the Broadwell-H family, including both 47- and 65W chips. All are designed for use with over 100 Intel Z97-based motherboards on the market, Intel revealed.

The Core i7-5775C with the Iris Pro 6200 core will be twice as fast in 3D graphics as an i7-4790S, Intel said, and 35 percent faster in video conversion and 20 percent faster in general compute performance. In mobile, the improvements will be more modest; a Core i7-5950HQ will be 20 percent faster in 3D graphics than the prior i7-4950HQ, Intel said.



The chipmaker is claiming that the new chips will scream where online gaming is concerned, with frame rates topping out at 147fps with League of Legends.

Intel hasn't offered any metrics for battery life in its mobile chips.

Google hypes Android M, Android Pay, Google Photos at I/O 2015

Google shows off new software at annual I/O developer conference in San Francisco

Google kicked off its annual I/O developer conference in San Francisco, showing off a new version of Android, a VR camera rig, numerous developer resources, and a lot more besides in an opening keynote that took up the better part of two hours.

Senior vice president of product, Sundar Pichai, hosted the event, which the search giant says attracted 6000-plus developers.

Much of what had been rumoured before the show did, indeed, appear on stage at the Moscone Center, including the aforementioned new Android version, Google Photos, Android Pay, and more. But there were conspicuous absences, as well, for example, Google didn't mention its enterprise-focused products such as Android and Apps for Work, nor the rumoured Project Fi wireless service, or the Project Ara modular smartphone.

Android M

Arguably the biggest piece of news was the announcement of Android M, or Android 6.0, which was made available to developers today and is set to appear on user devices later this year.

The new operating system isn't going to make too many big waves on its own - it doesn't overhaul the interface design or radically change the way people interact with the device. But it does bring minor but helpful tweaks like granular app permission settings (which allow users to deny or approve specific permissions, like location tracking or Wi-Fi information, from each app), and Chrome custom tabs, which uses preloading and deep app integration to offer a more native-like mobile web experience.

Android Pay

As expected, Google rolled out a new mobile payment infrastructure called Android Pay at I/O 2015. It's similar to Apple Pay and Google's earlier attempt at mobile payments, Google Wallet, in that it's an NFC-based system where you wave your phone at a properly equipped point of sale, but it adds an open infrastructure and improved tap-to-pay capability.

Google says there are 700,000 stores in the US that can accept Android Pay. Perhaps a payment war between Apple and Google will produce a renaissance through



aggressive competition, but at the moment, mobile payment still isn't the show-stopper that tech companies seem to think it is.

There was no word on when we can expect it here in the UK, though.

Google Photos

It wasn't an announcement that sounded like it was going to make a great splash at the outset - Google largely just removed the photo management features from Google Plus and made them into a stand-alone product. The kicker, however, was the news that Google Photos will offer an unlimited amount of storage for free, so long as your photos are 16Mp or less and your videos are limited to 1080p.

The usual Google-flavoured privacy qualms apply, of course, as does the frequently cited nostrum about free products signifying that you are the product, not the consumer. But the rash of speculation that this spells big trouble for services such as Dropbox doesn't seem entirely nonsensical.

Cardboard

It's tough to avoid the impression that Google's very pleased with itself for coming up with Cardboard -- as a company known for its place on the blistering edge of high tech, the change of gears showing off a simple cardboard frame for using smartphones as VR devices is a big one.

The updated version allows it to handle larger phones, of up to 6 inches in diagonal screen size and support for iPhones, to boot. Google showed off a video of a classroom of schoolchildren enjoying a virtual field trip via Cardboard during the event.

Jump

To go with the new virtual reality viewing devices, Google announced a nifty 16-unit system called Jump, which will enable users to create their own VR content and post it to YouTube. It's certainly impressive, but it's also not something you'll be able to buy anytime soon, and the logistics of creating content via Jump and uploading it to YouTube are not entirely clear.

Android Wear

Google talked up its recent update of its Android Wear platform with new gesture controls, including the ability to scroll through menus with the flick of a wrist and draw emojis with a finger. Google also rolled out integration with Uber and several other companies, enabling users to do things like summon a ride with a quick voice command.

Project Brillo/Weave

Brillo is a stripped-to-the-bare-bones version of Android designed to run on low-powered devices. Together with its new machine-to-machine communications standard, dubbed Weave, Brillo represents a major Google push into the Internet of Things.

Google Now

It knows you even more intimately now - Google demonstrated some impressive new technological breakthroughs in its knowledge-graph/personal assistant/brain replacement Google Now. These include natural language processing for easier voice interface and a feature called What's on Tap that displays information based on whatever it is the user is doing at the moment. ☒

Calling time on the Apple Watch

Why the Apple Watch sucks and you'd be mad to buy one

I've been an Apple fangirl for several years now and never once questioned myself, but it was the launch of the Apple Watch that made me take a step back and look at the bigger picture. Many of my friends and colleagues were raving about the smartwatch, and making excuses for its poor battery life and extortionate price tag and it got me thinking for the first time ever that I'm never going to call myself an Apple fangirl again.

That's not to say that I don't like Apple any more. Far from it, in fact. I love my iPhone and despite using many different Android smartphones in recent months, I've always been eager to go back to iOS. I also think the iPad is the best-looking tablet around and you wouldn't be able to convince me to go back to using a Windows PC.

But when it comes to the Apple Watch, I just get annoyed. Yes, it's good looking. I'm not going to pretend otherwise. But spending more than £299 on a smartwatch that'll be replaced within a year by something a thousand times better is something I just cannot justify. Worse still is the fact that there are smartwatches out there (and there have been for years) that can do a better job at many things than the Apple Watch and for at least half the price.

Admittedly, I haven't spent loads of time with the Apple Watch. I wore it for one weekend and gave it back. I've also never been its biggest fan. Back in the May issue, I wrote about how bored I was of the Apple Watch, and that was before it had even been released to the public.

But now that it's here, I still cannot fathom why anyone would spend £299 (and let's face it, many people are spending a lot more than that if they're opting for the bigger watch face or the stainless steel model) on a product that is unnecessary, a first generation (come on people, you know better than that), and insanely overpriced when compared with the competition.

I've heard people say (and they're owners/fans of the device don't forget):

"The most useful thing about it is that if my phone was rings when I'm out, I know. I can't always answer, but at least I know that I've missed a call."

"You can make the battery last all day, but you'll have to turn off lots of the features."

As noted by Matt Egan on page 10, some Apple Watch users have said that although it



is at first tricky to use, over time it becomes 'intuitive,' which completely defeats the meaning of the word.

Those statements are exactly why I've made the decision never to say I'm an Apple fangirl again. I can't imagine why anyone would want to buy an Apple Watch unless they've got their eyes completely closed to the competition, and that's what makes me angry because maybe they have.

What's the time?

Even the fundamental feature of telling the time is more difficult than on a normal watch. You have to let the Apple Watch know that you want to look at the time by moving your wrist in a twisting motion or pressing the Digital Crown on the side. If you're sitting at a desk and want to look at the time it should be a case of glancing down at your wrist, but to save the battery, you'll see a blank screen unless you move it.

If this was the first smartwatch around I would not be writing this, but we all know it isn't. There are many, many other devices that can do lots of the things the Apple Watch can do. Some of them can do it better and the vast majority of them are much cheaper. Plus, lots of them work with the iPhone, so you don't need to switch to Android if you don't want to.

For example, the Pebble Time Steel costs about £160 (it's coming out in July, so the price isn't official yet). Yes, it's not as good-looking as the Apple Watch and its features are more limited, but it has a colour e-paper screen that means the battery can last for up to 10 days and the display is always-on so you'll be able to see the time with a quick glance.

You'll still get notifications, you'll still be able to dictate replies to messages using the built-in microphone and there's a dedicated app store with thousands of apps.

It's water resistant like the Apple Watch, it works with any standard 22mm watch band, so if you fancy a change it's easy-peasy and there are three finishes available (silver, gunmetal black or gold).

Also, as the name suggests, the Pebble Time Steel is made with Stainless Steel - to get that from the Apple Watch you'll be forking out a minimum of £479. It also comes with a leather strap for that price, something Apple charges an extra £170 for (yes, that's not a typo. £170, more than the price of the Pebble Time Steel itself).

Of course, the Pebble Time Steel is just one of many Apple Watch competitors (before you start accusing me of being paid by Pebble, which is absolutely not the case I'm afraid). Some of my favourite Android Wear smartwatches include the LG G Watch R and Motorola Moto 360, both available to buy for under £225 (in fact the Moto 360 is under £150). You won't be able to use them with your iPhone, but they can help you achieve most of the same things as the Apple Watch and I really love that round watch face, too.

All that ranting and I haven't even touched upon the Apple Watch Edition's price tag, which reaches up to £13,500 (again, not a typo). £13,500 is a price some people would pay for an incredible timepiece, but those are the kinds of watches people pass down to their kids after 50 years of wearing them. This one's going to be as useful as a chocolate teapot in a couple of year's time.

There, I've said it. I really, really don't like the Apple Watch.

ASHLEIGH
ALLSOPP





Most useless gadgets of all time

Expensive, poorly made, badly conceived (and that's just the article). Gadgets that are just, well, crap

All too often, the latest gadget is a solution looking for a problem. Here are the 10 most useless computer gizmos all time. We've listed the products in only a rough order (although our number one most useless product is a belter), and we've given each a uselessness score out of five in which one could be conceivably of some use, and five is a chocolate tea pot.

10. Nokia N-Gage

One to consign to the pile of 'a good idea done wrong'. We now know that there is a market for portable gaming devices that are also smartphones. Nokia's mistake was to add phone capability to a games console, rather than gamifying a smartphone. The result was useless: pretend to make a phone call on your Wii and you will get the idea.

The N-Gage cost £75 more than Nintendo's Game Boy, had few titles to play on it, and looked awful both as a console and as a smartphone. Awful, and useless. **Uselessness rating: 4/5**

9. DivX Enhanced DVD Players

An example of good tech ruined by bad policies. DivX means something benign these days, but back in 1998 the Digital Video Express moniker was originally appended to an effort to create 'disposable' time-limited DVDs that could stop DVD rental discs being pirated. DivX players may have had a chance if they were free, or at least cheaper than standard DVD players. But no, DivX 'enhanced' DVD players costs a lot more than standard DVD players, and required you to attach a telephone line in order to play a rental disc. This was enough to kill DivX at a time when most households needed their phone lines to make calls.

What made it a fate worse than death was the early privacy concerns customers had about faceless corporations tracking what they watched. Why worry about that, huh?

How would you describe something that costs more to hobble a standard product? One word: useless.

Uselessness rating: 3/5

8. Datawind PocketSurfer2

My personal favourite. And another idea poorly executed, and very badly timed.

Picture the scene: it's mid-2007, and the internet is primarily a desktop affair. Plenty of people are still on dial-up, and even those with home broadband tend to be tied to a desktop via ethernet cables. Even getting a web connection to your home is a complicated and expensive business. Tech-savvy mobile communicators tend to carry BlackBerries, and the mobile internet consists of scratching around for football scores and cinema listings via WAP.

The PocketSurfer2 offered a solution to these problems. A phone without the ability to make calls, it was a mobile cellular internet device. A smartphone-sized pocket book with a qwerty keyboard that purported to offer the full internet on the go, as well as a dedicated email device. Websites were crunched through a special caching process that meant they required very little data to be pulled down. Better yet there were no contracts entered into, DataWind said. You simply paid a one-off fee, and accepted adverts when you booted and shut down your PocketSurfer2.

In a world in which the mobile internet seemed positively futuristic, it was an impressive pitch, so what went wrong? Well for one thing the device failed to live up to

expectation. I had one for a year and it was replaced - free of charge, I grant you - no fewer than three times. The third time it fell to pieces, I chucked it in a drawer and forgot about it. I might have persisted, but there was another problem: in order for cellular connectivity to be free DataWind needed sufficient users to make the advertising model work. And, well, it didn't have them. So in order to keep pocket surfing I needed to shell out for a subscription.

Frankly, the experience wasn't worth it. Anyone who used a PocketSurfer2 rapidly came to the conclusion that whatever it was - and it was a decent emailer - it was nothing like the full internet. What it was might have been enough, however, were it not for the timing issue. Because the PocketSurfer2 launched just after the iPhone, and although it limped on for a year or two, it was finished.

A big promise unfulfilled. An iPhone rival that was anything but. Poorly made, awful to use. Useless.

Uselessness rating: 1/5

7. NEC Pro Mobile 200

The history of Microsoft and mobile is a paean to the useless. Lest we forget Microsoft touted the tablet form factor long before the iPad was created, and it has been trying to get mobile Windows off the tarmac for a decade or more.

The NEC Mobile Pro 200 was one of nearly two dozen Windows CE 1.0 devices launched in 1996. Not only did it not support Microsoft's newly released Outlook, it didn't work with any non-Microsoft PIM or email client. Win CE 1.0 handhelds were quickly rendered obsolete by Win CE 2.0 devices, which eventually turned into Pocket PCs and Windows Mobile phones.

The NEC Mobile Pro 200 is one of many useless devices, but useless it was indeed.

Uselessness rating: 3/5

6. Microsoft Mira

Sticking with Microsoft, here's its Mira wireless touchscreen display, which Microsoft unveiled with great fanfare at the 2002 Consumer Electronics Show. The idea may still come to fruition. Microsoft wanted consumers to mount these LCDs on the walls of their homes and use them to remotely access their computers. Not for the first time execution didn't match ambitious invention. The Mira cost \$999. It also ran business Windows - an odd choice for a digital home product. And it looked awful.

Overpriced and underwhelming. Useless.
Uselessness rating: 2/5

5. Sony Vaio Mouse Talk

What were they thinking? Of all the ill-conceived tech products, the Sony Mouse Talk is one of the more memorable. It was launched back in the glory days of VoIP (that's Skype to you and me) when USB-connected 'internet' phones were all the rage.

Instead of using your desktop speakers and a microphone connected to your PC's sound card, you could pretend you were on a real, wired phone. Never mind that the call quality made it sound like the person on the other end was in a swimming pool.

The Mouse Talk, however, took things a step too far, by combining a VoIP handset with a mouse. One minute, you could be clicking around in Windows, the next on call with a relative in Australia.

On paper, the VN-CX1/B sounded reasonably good. Sony said it would "control desk clutter while adding a touch of style and ingenuity to your workspace". But ingenious it was not, since the Mouse Talk could perform only one of its functions at a time. When on a call your mouse would be out of action, leaving you unable to check a website or look up a phone number to pass on the information to your caller. Either that or you had to lean your head sideways with your ear almost touching the desk and attempt to use the mouse by feel alone.

Just as a smartphone with a built-in shaver would be a retail disaster, the Mouse Talk quietly disappeared from PC World's shelves. It was useless.

Uselessness rating: 4/5

4. Nintendo Virtual Boy

This 'portable' 3D gaming system may have been the biggest disaster to come out of Japan since Godzilla. Virtual Boy fans had to press their eyes into the machine's goggles to get the 3D effect, while simultaneously holding the unit steady and manipulating the unit's six-button control pad.

The Virtual Boy chewed through AA batteries like a hungry virtual goat, displayed monochrome images only, and offered a paltry 22 games (14 in the US) before getting pulled from the market a year later. And did we mention that using the Virtual Boy made some people ill? Nintendo advised users to take breaks every 15- to 30 minutes to avoid eyestrain, headaches, and nausea.

Impossible to use, and nauseating. Useless.
Uselessness rating: 3/5

3. USB Finger Dance Mat

With the USB Finger Dance Mat, you could have a party on your desk with everyone invited - though discretion might have counselled you to think twice about demonstrating the digital skills you developed over many painstaking hours of practice to, say, your boss.

To use the device, you just plugged it into your PC, slipped your digits into the cardboard finger character (two choices: Disco dude or *Flashdance* chick), and tapped your fingers in time to the flashing lights on the 4x4in dance floor. It was fresh, it was funky, it was totally embarrassing if anyone ever caught you doing it.

Which, apparently, few did, since the Dance Mat was discontinued shortly after it debuted. Still, it was a fun way to take a break between cleaning out your desk and picking up your P45.

Job-losingly useless, but fun.

Uselessness rating: 2/5

2. King of Key

King of Key arrived in the offices of our publisher IDG in 1999 - and its sheer brilliantly hilarious awfulness has stayed with us ever since. It manages to be crap in so many ways, it's almost a field guide for newbie reviewers on what makes a product terrible: its concept is ludicrous, its construction is tacky and it's pretending to be something it's not.

The £80 King of Key was the laptop equivalent of a gold tooth from a West Ham dentist. It's a replacement for the then-cutting-edge Apple PowerBook G3's 'Home' key that's gold and has a diamond in the middle of it - a diamond that will bring you luck apparently. The gold turned out to be flaky paint, and the 24-carat diamond - which was accompanied by an authenticity certificate - was valued by a nearby Hatton Wall jeweller as being worth less than a tenner.

Unfortunately the luck brought by the King of Key didn't rub off on the company that decided this is really what British Mac owners needed to own - MyGate went bust in 2001.

Totally, utterly, useless.

Uselessness rating: 6/5

1. Apple Watch

Okay. The Apple Watch is clearly not the most useless product of all time. It has some uses. But it gains points for hype and cost. And the fact that otherwise sensible people (the editors of *Macworld UK*) are convinced that it is a good thing, when it is clearly a joke that has got out of hand.

It's just that the Apple Watch is the culmination of all of those annoying things about Apple. There's the smug way in which the few Apple Watch users demonstrate features long available in Android Wear, and before that on the excellent Pebble. The true believers' habit of describing something that clearly looks like a piece of crap as a design classic. Seriously: look at the Moto 360 and tell me that you *love* the way the Apple Watch looks.


More recently I have been told by more than one Apple Watch user that although it is at first tricky to use, over time it becomes - I quote - 'intuitive'. This failing to understand the meaning of the word intuitive.

The Apple Watch is over-priced, coming in at least half as much again as a comparable Android watch. It is at its cheapest twice as expensive as the ugly but far-from useless Microsoft Band. That's right: Microsoft has made a more useful and reasonably priced smartwatch than has Apple.

Microsoft, you say? The company that makes phones that iPhone users criticise for lack of apps. A problem critical in the smartphone world, but not a problem at all for the Apple Watch. (Why you would need an app for your watch defeats me, but you must do because Apple tells us you do.)

Apple fans will never understand any of this. Nor will they care. Not least because Apple has strived to ensure that the Apple Watch is the only smartwatch with which you can reasonably pair an iPhone. So value becomes a moot point: Apple wilfully restricts the number of peripherals with which you can pair your iPhone, so at any point from £0- to £1,000, the Apple Watch is the best deal you can get. Which may be just as well. If and when Google manages to get an Android Wear app on to the iTunes App Store, the Apple Watch may start to look like a very poor deal indeed.

It remains to be seen how popular will be the Apple Watch. And it isn't entirely useless. But when you ponder the gap between hype and reality, and look at exactly how much use you get for your money, Apple's smartwatch is deserving of a place on our list of infamy.

Uselessness rating: 2/5 

MATT EGAN



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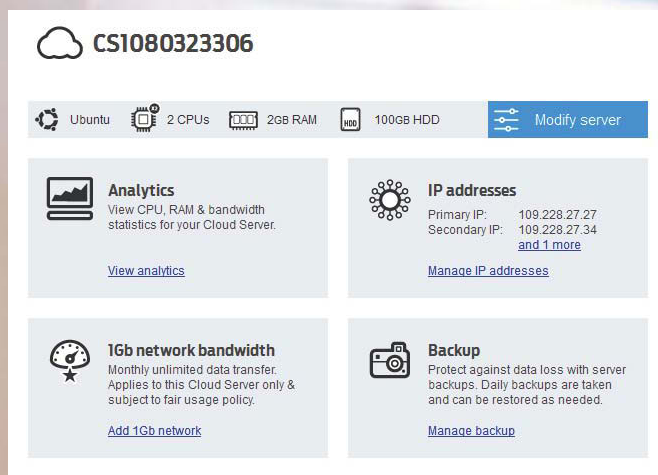
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HP's PC group focuses on design and gaming ahead of spin-off

HP's PC group is trying to establish a strong brand identity before it splits into a separate company. [Agam Shah](#) reports



HP's PC group doesn't want to be a 'screwdriver' PC maker that sells look-alike laptops and desktops.

Instead, the company is focusing heavily on design and new innovations as it prepares for a spin-off into a separate company.

It's cutting the plastic and adding metal and new colours to the chassis of its laptops and desktops. HP is also expanding its hardware options for consumers, businesses and gamers, and focusing on a future when virtual reality will be an important part of the computing experience.

PC makers need to update the devices because customers are paying more attention to how devices look and function, argued Mike Nash, vice president for consumer PC and solutions at HP's Printing and Personal Systems Group.

The gradual changes come ahead of HP's split of its PC and enterprise groups into two separate companies. The PC group will be known as HP Inc, and the goal is to establish a committed fan-base for its PCs, much like Apple. The spin-off is expected to be completed by the end of fiscal 2015.

One example of changes to the PC group is the company's new Pavilion desktops (pictured above), which will ship in the coming month with a metal chassis and in multiple colours. That's

a change from decades of plastic chassis, and the metal finish provides the PCs with a classier look. But with prices starting at £269, the desktops are also more expensive than previous models with plastic chassis.

HP is also actively pushing immersive computing into its PCs and tablets, much like what Microsoft is doing with its HoloLens holographic headset. Last year, HP started shipping Sprout all-in-one PC, which allows users to scan a 3D object via a RealSense camera and then manipulate the image on a specialised Touch Mat surface. HP has also showed the 23.6in Zvr 'virtual reality' monitor, which projects 3D images into thin air. Those images can then be navigated, zoomed and manipulated by a stylus without the need to touch the monitor's screen.

The Sprout and Zvr provide a new spin on 3D technology, and the products are closely tied to HP's burgeoning 3D printing strategy. The company is bringing the ability to scan, project and manipulate 3D images on

HP PAVILION MINI DESKTOP PC



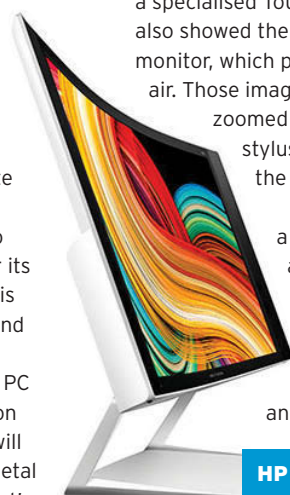
more PCs and tablets. Users will then be able to print scanned objects on the company's 3D printer, due for release in late 2016.

HP also needs to work harder to attract gamers to its

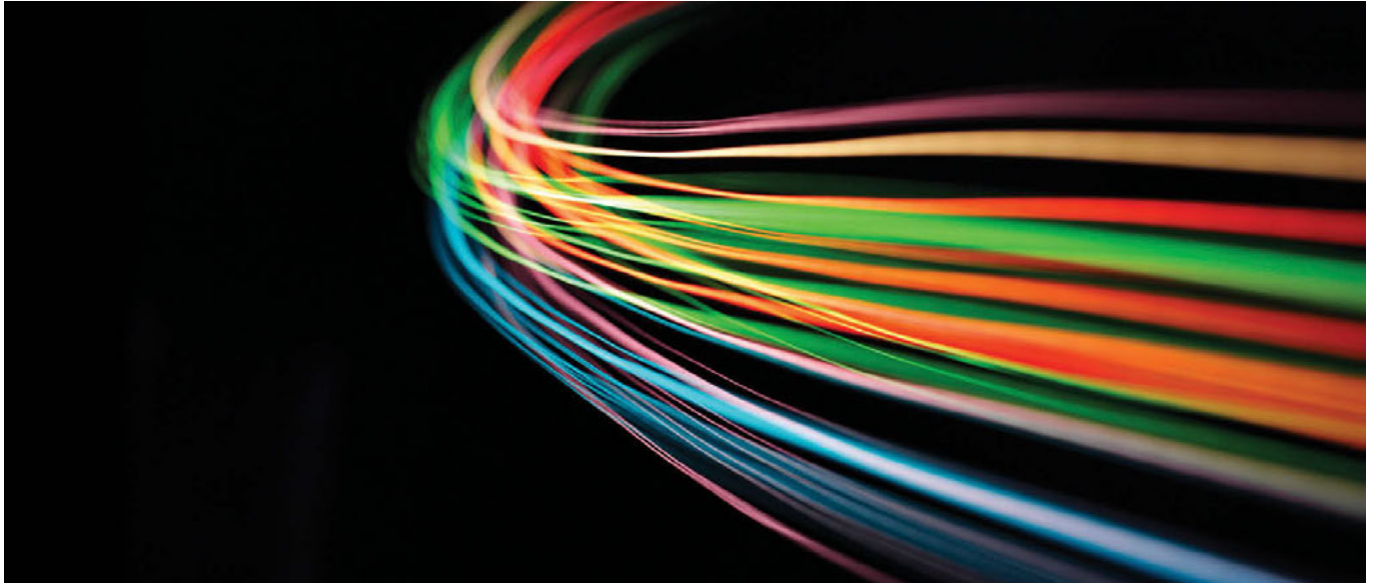
PCs, a fast-growing market within the PC sector, Nash explained. Gaming PCs have largely been the domain of boutique companies such as Falcon Northwest and Origin PC, but Dell has stepped up its game with Alienware PCs, and Acer is targeting the market with a range of PC, mobile and display products.

HP recently introduced Envy Phoenix Desktop, its first gaming desktop that can be overclocked. The liquid-cooled system, which is priced starting at £1,499, ships with a two-year warranty, saving gamers from the risks of overclocking.

HP is also paying attention to Steam, a popular PC gaming platform that allows users to buy games and connect with other gamers. Nash didn't say whether the company will come out with a dedicated Steam machine based on Steam OS. Competitor Dell is planning to sell Steam machine using its Alienware Alpha gaming console, which currently runs on Windows 8.1. [X](#)



HP SPECIALITY Z DISPLAY



IBM switches on the light for high-speed data transfers

IBM's new silicon photonics chip will compete against a similar Intel technology. [Agam Shah](#) reports

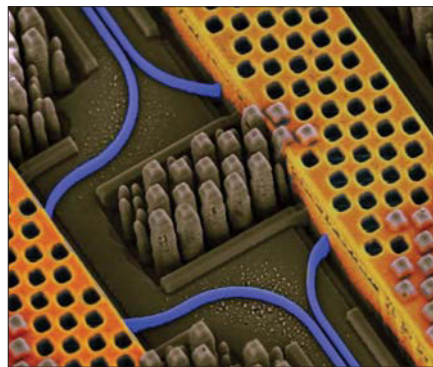
IBM is ready to light up data transfers over long distances between computers with a new chip that could spell the end for slower electrical wiring. After a decade of research, IBM has developed a new silicon photonics chip that can transfer data at aggregate speeds of 100Gb/s (bits per second). In tests, the reference chip could transfer data using pulses of light over a distance of 2km.

Light can transfer data faster than copper cables, which are used in data centres to link storage, networking and servers in data centres. The silicon photonics chip could aid in introducing high-bandwidth optical fibre connections in future generations of supercomputers and servers, especially with vast amounts of data moving between computing resources.

IBM is developing the technology with the intent to push it in data centres, and it won't be in PCs or handhelds anytime soon, said Wilfried Haensch, senior manager of IBM's Silicon Photonics Group.

The silicon photonics technology could also fundamentally change the way servers are implemented in data centres by decoupling the processing, memory and storage units into separate boxes. The design could help applications run faster and reduce component costs by consolidating fans and power supplies.

There is also demand for more computing power in servers with applications such as



Inside view of an IBM **SILICON NANOPHOTONICS** chip

analytics, machine learning and big data. Optical connections could help dozens of processors communicate on a server rack, making it easier to break up processes over multiple resources, according to Richard Doherty, research director at The Envisioneering Group.

Optical connections could make servers much like storage drives, which can be easily hot-swapped depending on processing needs in data centres, Doherty said.

Light is already being used for long-distance data transfers over telecom networks, but that technology can be expensive. Optical cables are also available for the Thunderbolt interconnect, which is used in Macs and PCs for high-speed data transfers with external peripherals.


IBM's silicon photonics technology is meant for shorter distances, and is cheaper than optical technology used in telecom networks, Haensch argued.

Intel has also made silicon photonics chips for data centres, but has struggled to ship them on time. IBM may not be the first with a silicon photonics chip, but its technology is more viable and less complicated than Intel's, Doherty said.

IBM's chip is "more manufacturable" as it has a simple integrated silicon structure and is cheaper to make, while Intel's structure needs additional physical components, according to Doherty.

Intel, however, said that its optical components are integrated and have testing and cost advantages.

The chips are also fundamentally different in how they transfer data, but have their cost and performance advantages. IBM's chip transfers data over a single fibre using four different 'colours' as channels, while Intel's technology could scale faster with more fibres added to optical cables, Doherty said.

Intel has built MXC optical cables that can have up to 64 fibres, with each fibre transferring data at 25Gb/s. But adding fibres can be expensive, and IBM's single-fibre implementations could be cheaper and meet many speed and distance requirements in data centres, Doherty said. IBM declined to comment on when the silicon photonics chips would reach the market. 

UNICEF, ARM use wearables to help underprivileged

Agam Shah reports on 'Wearables for Good Challenge'. A programme aimed at developing wearables that can help improve the health of mothers and children

Wearables are often considered novelty items, but UNICEF believes the devices could revolutionise health and education and improve the lives of millions in developing countries.

The UN agency, along with chip company ARM and design firm Frog Design, launched the 'Wearables for Good Challenge' programme to encourage the development of low-cost wearables that can be used to improve the health of mothers and children in emerging economies.

The plan is to develop no-frills wearables that are practical for deployment in remote areas, so that, for example, a mother could track her pregnancy's progress and determine whether she needs emergency care, according to Erika Kochi, a co-founder of the UNICEF Innovation Center.

Wearables could also be used as part of an alert and response system during a natural disaster or humanitarian crisis, Kochi said during a press conference in New York. They could serve as e-book narrators to help with the education of underprivileged children, as well.

UNICEF and the partner companies are asking developers to come up with ideas over the next six months. Project proposals can be submitted via the Wearables for Good Challenge website. Frog Design will help in the design of products, while ARM and UNICEF will identify relevant projects. The products should be affordable to make and sustainable, and focused on helping

with health problems affecting mothers, newborns and children.

Changing lives

Kochi said wearables could become as ubiquitous as mobile devices, which have changed the lives of millions of people in far-flung regions by connecting them to services and information. Sensors in the wearables could also aid in data collection, and cloud-based analysis of the information could help UNICEF better respond to crisis situations and to the needs of communities.

But developing wearables is easier said than done. A device has to be designed to fit a particular community's needs, geography, demographic patterns and culture. For example, a majority of communities in Burundi are off the power grid, so people there would need wearables with solar charging capability or with long-lasting batteries. The wearable needs to be "invisible", so it doesn't cry out for attention, and isn't treated by children as a toy, explained Simon Segars, CEO of ARM.

The Wearables for Good Challenge is the first project launched by ARM and UNICEF, which have formed a multi-year partnership. For example, ARM also plans to collaborate with UNICEF's Innovation Labs and country offices to jump-start pilot technology projects that have the potential to have an impact at a national level.

The Wearables for Good Challenge is similar to the One Laptop Per Child effort

to put laptops in the hands of school-age children in developing countries. OLPC took on development, manufacturing and sales of the laptops to schools and governments, but faced challenges at every step. UNICEF is, however, already working with governments, while partner companies will come up with wearable designs and components, which mitigates implementation and deployment issues, Kochi said.

There's always the risk that the UNICEF-ARM effort, like some philanthropic efforts sponsored by tech companies, may run into trouble and controversy at some point. That has happened to Facebook's Internet.org, which aims to deliver free mobile internet access to the underprivileged in developing countries. Internet.org was criticised by the Electronic Frontier Foundation as being "not neutral, not secure, and not the internet" and, in an open letter sent to Mark Zuckerberg, backed by more than 60 other digital rights groups, said the program increases inequality and undermines net neutrality.

While the goals of the multi-year effort are lofty, UNICEF is optimistic that the partnership will yield the expected benefits. ARM's Segar said the first results may materialise in September or October.

For ARM, partnering with UNICEF is an opportunity to fulfil its corporate social responsibility strategy while improving product and licensing sales. ARM hopes its processors - which dominate mobile devices - will go into more wearables. ☒



European mobile operators divided over blocking ads

A plan to put pressure on Google by strangling its ad revenue has come under fire, says **Mikael Ricknäs**

Several European telcos have come out against a scheme by their fellow operators to block advertising as a manoeuvre to force Google to share its revenue.

An executive at a European telecom operator has said it and others are planning to start blocking online ads this year in their respective mobile networks, the *Financial Times* reported recently.

First, the unnamed operator will launch an advertising-free service for its subscribers on an opt-in basis. However, there are also plans to use the technology across its entire network. The plan is to specifically target Google, blocking ads on the company's websites in an attempt to force the online giant to share its revenue, according to the *Financial Times*.

How many operators are backing the idea isn't clear, but there are several that think it's ill-conceived, including Deutsche Telekom and Swedish operator TeliaSonera, which has networks in the Nordics, Baltics and Spain. Neither has any plans to block advertising on their networks.

"Without having done a detailed analysis of the technology or its implications, we doubt this is something that would go down well with our customers," said Nicholas Rundbom, director of communications for TeliaSonera, adding that it doesn't make sense to get into a dispute with a company that drives a lot of traffic.

Deutsche Telekom didn't elaborate on why it thought blocking ads was a bad idea, but two other operators that didn't want to be named offered some thoughts.

"I don't know where to begin, to be honest with you. Blocking ads opens a whole lot of questions, not only on the net neutrality side of things, but also whether it's legal to do that," said a representative for one operator. It's a good thing for the operator to have subscribers who consume lots of data over its networks using ad-funded services or applications; they can decide for themselves whether they want to block ads.

"We don't believe in blocking and working against the over-the-top app developers, be that Google or someone else. Finding ways to collaborate is a much better approach," an

executive at another operator said. However, there is a concern about where revenue streams are going, and if a mobile operator did what Google and Facebook do with user data, the reaction would be one of outrage, according to the executive.

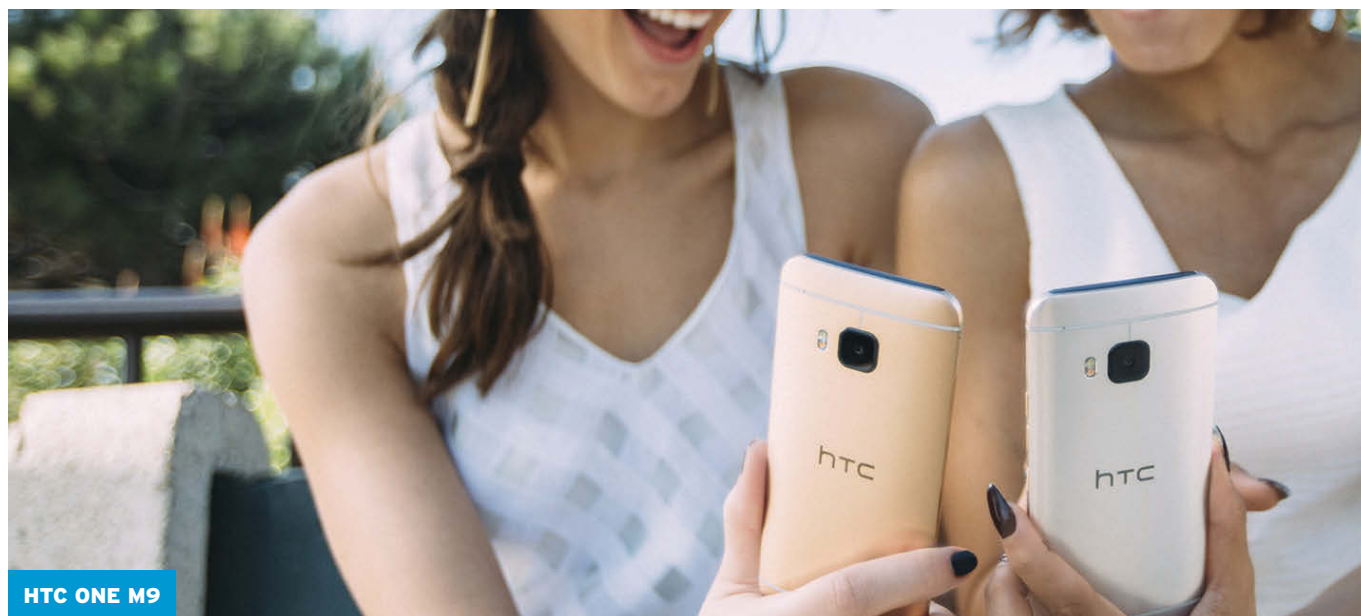
Google responded to the report by saying the reason people pay for mobile data is so they can access apps, video streaming, webmail and other services, many of which are funded by ads.

Operator interest in online advertising revenues was made clear recently when Verizon Communications announced its planned \$4.4bn acquisition of AOL. Part of the motivation for the deal is to get access to AOL's advertising technology.

The worries mobile operators have are easy to understand. Their voice and messaging revenue streams are under pressure from apps such as Skype and WhatsApp, and they have failed to develop new apps that are popular with their users. At the same time, aggressive price competition in many countries is putting pressure on revenue from data. ☒

LTE smartphones becoming faster and cheaper

Speedy connections in high-end smartphones won't work without matching network coverage; cheaper phones may encourage carriers to invest. [Mikael Ricknäs](#) investigates



HTC ONE M9

High-end smartphones offer high-speed wireless connections, but few mobile operators have made the infrastructure investments required to keep up with them. The arrival of cheaper phones with 300Mb/s LTE capabilities may encourage that investment.

LTE chips with real-world download speeds over 100Mb/s have become a standard feature on high-end smartphones, while smartphones costing under £100 now include LTE chips, albeit slower ones.

Better cameras, screens and design have received most of the attention on this year's crop of high-end smartphones, but support for the latest versions of LTE, a rarity a year ago, has become a standard feature. Download speeds on the HTC One M9 and the LG G4 top out at 450Mb/s on paper, while the Samsung Galaxy S6 is theoretically capable of 300Mb/s.

The underlying technology allowing these feats is LTE-Advanced. It allows phones to simultaneously use radio channels in different frequency bands for greater throughput, a technique known as carrier aggregation.

Chipmakers such as Qualcomm are readying more affordable chips that will bring 300Mb/s capabilities to mid-range phones too: Smartphones powered by the

Snapdragon 618 and 620 are expected to arrive during the second half of this year.

In phones costing between £200 and £300 without a contract, Qualcomm's Snapdragon 615 is one of the most popular processors, so it seems reasonable that smartphones powered by its successors should cost about the same.

Of course, existing and future smartphones won't be able to take advantage of the bandwidth increase that LTE Advanced offers unless networks have been similarly upgraded, something that's likely to happen if carriers see increased demand. At the end of April, 30 out of 393

commercial LTE networks offered speeds of up to 300Mb/s, in countries including the UK, Germany and South Korea, according to the Global mobile Suppliers Association (GSA). Nine 450Mb/s networks were either in trial or being deployed, the GSA said.

Coverage at those speeds is still limited, even within the countries where it is available. For example, British mobile operator EE offers 300Mb/s only in parts of central London and at the Wembley sports arena. There the real world speeds are up to 150Mb/s, it said.

EE is lucky in that it has a large frequency allocation in which to deploy the technology.

SAMSUNG GALAXY S6



Other mobile operators simply don't have enough radio spectrum to do it.


But LTE smartphone development isn't just about providing higher speeds on expensive devices. There is also a growing demand for affordable products as the technology is being rolled out in developing countries.

In May, chip maker Marvell boasted that a SoC (system-on-chip) it developed is powering a £65 LTE smartphone from

Chinese manufacturer XiaoLaJiao. In addition to LTE, the HongLaJiao phone has a quad-core processor, a 5in HD screen and an 8Mp camera. That you can buy a whole LTE smartphone for less than it costs to upgrade the storage on an iPhone or a Samsung Galaxy S is quite extraordinary.

In the US and Europe, there isn't the range of sub-£200 smartphones with LTE that consumers in China and India can choose between. But products like

the Motorola Moto E still offer good value for money, even though the specs aren't keeping up with new models from the likes of Xiaomi and Micromax.

These smartphones illustrate two closely related developments: the newfound affordability of LTE and the increasing competition between chip makers, which bodes well for the future. Today users pay a premium for LTE, but by next year that will likely be a thing of the past. 

Samsung's Artik boards aimed at drones, robots and IoT

Samsung's three Artik boards have varying speeds and power consumption, and are meant for different device development. **By Agam Shah**

Samsung has announced it is to release a trio of hardware development boards that will make it easier for startups and tech enthusiasts to build robots, drones, wearables and all manner of other connected gadgets.

The Artik family includes three development boards with varying levels of performance to let developers build smart devices for use at work and at home. The boards are much like the Raspberry Pi 2, but with wireless connectivity that allows them to broadcast and receive information.

Samsung is also providing software tools, security features and cloud services, meaning a developer could potentially use the Artik kits to build an entire home automation system.

The Artik boards are part of an effort by Samsung to sell more components and services for the fast-growing Internet of Things, which has come to mean virtually any connected device that's not a PC, smartphone or tablet. Estimates have pegged the number of IoT devices to reach 30- to 50 billion by 2020, and Samsung wants to secure itself a piece of that pie.

It's not alone. The maker community is already getting a lot of love from companies like IBM, ARM, Qualcomm and Microsoft, the last of which hopes to build

an IoT future around its Azure cloud service. Microsoft has also made Windows 10 compatible with the Raspberry Pi 2 and MinnowMax boards, hoping developers will build Windows-compatible connected devices.

The Samsung boards include the Artik 1, the smallest module at 12x12mm. It has Bluetooth connectivity, a dual-core processor with a clock-speed of 250- to 850MHz, and basic sensors including an accelerometer, gyroscope and magnetometer. The higher performance Artik 5, at 29x25mm, is for building drones and wearables. It has a dual-core 1GHz chip, ARM Mali graphics, 4GB of storage and 512MB of DDR3 memory.

The fastest and biggest board is the Artik 10, which has similar components to those in a high end smartphone. They include an eight-core ARM chip that can process 1080p video, 2GB of DRAM and 16GB of storage. It has a full complement of wireless connectivity with Wi-Fi, Bluetooth and Zigbee. The Artik 10 could form the basis for a home media server or powerful industrial IOT devices.




SAMSUNG ARTIK 1

Samsung hasn't given prices for the boards or say when they'll be available. It will provide them to a limited number of developers who sign up for an alpha program through the Artik website.

The tech giant is working with the team behind Arduino

to get the Artik kit certified to work with the popular Arduino IDE (integrated developer environment). "You won't have to be a professional developer to build with Artik; all you need is an idea," Samsung said.

Developers will be able to connect the boards to cloud services to help them build applications. A service might collect data from a smart metre, for instance, and use it to decide when to turn a connected air conditioner on and off. Samsung's SAMI cloud platform allows for sensor information to be pushed into the cloud for analysis.

Earlier this year Samsung said all the TVs it sells will be "IoT devices" by 2017, meaning they'll be smart and connected. It said all the hardware products it sells will be IoT-ready by 2020. It has also pledged to invest \$100m to build an IoT developer community 

Chromebooks defy competition from Windows with growth in sales

The Chromebook craze won't abate this year, [explains Agam Shah](#)



Chromebooks could face competition from low-cost Windows 8.1 and Windows 10 devices, but their popularity continues to grow.

Google's effort to add features and push Chromebooks into more hands is working, with shipments of the low-cost laptops expected to jump 27 percent this year.

Chromebook shipments worldwide will touch 7.29 million this year, research firm Gartner said Thursday. Growth will slow down in 2016, though, with Chromebook shipments reaching 7.95 million units, Gartner said.

First introduced in 2011, most computer users are still just getting used to the Chromebook concept. The low-cost laptops, which run on Google's Chrome OS, are designed for those who do most of their computing on the Internet. They are used in much the same way that tablets and smartphones are, with most applications requiring an Internet connection.

Google is continually adding features to Chromebooks, which start at around £200

for a basic model. PC makers such as Acer, HP, Dell and Lenovo have flooded the market with entry-level and advanced models.

Google is pitching Chromebooks as a Windows PC replacement, with a growing list of applications that can run offline. With content-sharing, videoconferencing and collaboration tools, the search giant wants to raise the appeal of the laptops for businesses.

Despite its growth rate, Chromebooks will still make up a small percentage of the roughly 300 million PCs expected to ship this year. In 2014, they found a niche in the education sector, which accounted for roughly 67.1 percent of shipments. About 26.7 percent of the Chromebook buyers were consumers, and 6.2 percent were business users.

According to Isabelle Durand, principal analyst at Gartner, Chromebook adoption will grow as computing moves to the cloud, but could face competition from low-cost Windows 8.1 and Windows 10 devices.

"The success of Chromebooks in the consumer market is as much dependent on high-speed Wi-Fi broadband, mainly outside the US, as it is on overcoming perceptions that apps in the cloud are not secure enough," argued Durand.

Tech-savvy users will continue to pick up Chromebooks as a secondary computing device to complement full-feature desktops and laptops, Durand said. Chromebooks could be appealing to small businesses that don't have big hardware budgets, she said.

There are challenges, though. The number of offline applications for Chromebooks are limited, users are still getting used to cloud-based applications such as Google Docs, and Wi-Fi issues plague regions including Asia-Pacific, expected to be a major growth area for Chromebooks.

Acer was the top Chromebook maker in 2014, shipping two million units worldwide. HP was second, while Samsung slipped further down the list after it stopped selling Chromebooks in Europe. ☒

Xiaomi and Micromax pressure established smartphone makers

Latest devices have the potential to reset customer expectations, [reports Mikael Ricknäs](#)

Indian smartphone manufacturer Micromax and Xiaomi from China have given the low-end market a shake-up with their latest products, and even if the devices don't go on sale around the world, their launches will be felt globally.

The Micromax Yu Yuphoria and the Xiaomi Mi 4i's combination of impressive specs and aggressive pricing will put pressure on the likes of Samsung and Motorola to step up their efforts in the segment for sub-£200 smartphones.

"It's more pain for the established vendors. These devices have the potential to reset customer expectations," said Ben Wood, chief of research at CCS Insight.

The Yu Yuphoria was launched recently in India. It's an LTE smartphone that will cost about £72 without a contract in that country. It has a 5in, 720x1280-pixel screen and a Snapdragon 410 processor. The specification also includes an 8Mp main camera and a 5Mp front snapper, as well as 2GB of RAM and 16GB of integrated storage. While smartphones in this price category were once known for their cheap-looking designs, the Yuphoria has a metal frame to help give it a more premium feel.

The Xiaomi Mi 4i is more expensive at around £130, though it offers better specs. The 5in screen, for example, has a 1080x1920-pixel resolution, while the processor is Qualcomm's more powerful Snapdragon 615. The main camera has a 13Mp resolution. It, too, has a 5Mp front snapper, LTE, 16GB of integrated storage and 2GB of RAM.

The two devices share another common feature: they leave competing devices in the dust by offering smartphone buyers a lot more bang for their buck.

The second-generation Moto G from Motorola may have a 5in, 720x1280-pixel screen and an 8Mp camera just like the Yuphoria. The front camera has, however, only a 2Mp resolution, the amount of storage and RAM is half that of the Yuphoria, and the price tag is still £140. There's also an LTE



XIAOMI MI 4I

version available in some parts of the world that makes the price difference even larger.

Samsung's mid-range smartphones also come off looking expensive, in comparison. The Galaxy A5 is just like the Mi 4i, an LTE smartphone with a 13Mp camera, 16GB of storage and 2GB of RAM. However, it has the less powerful Snapdragon 410 under the hood and the 5in screen isn't full HD. Instead, users have to make do with 720x1280 pixels and still pay about £299.

Having the edge


Even if the newcomers offer great specs for little money, Samsung and Motorola both think that they have an edge.

"They hope they'll be able to command a premium for their brand, but that margin is being eroded all the time," Wood explained.

The Yu Yuphoria and the Mi 4i are unlikely to go on sale in the US and Europe, because Micromax and Xiaomi continue to focus on their respective home markets, along with Bangladesh, Sri Lanka, Nepal and Russia for Micromax; and India, Taiwan, Singapore, Malaysia and Indonesia for Xiaomi.

However, the repercussions will likely result in better products that will go on sale globally. Samsung is dependent on this segment of the market to keep its volumes up, so it must come up with a competitive response, according to Wood. And the Korean company sells its products in as many markets as it possibly can. With the exception of the second-generation Moto G with LTE, Motorola has also shipped its affordable smartphones all over the world.

There are several reasons for the ascent of Micromax and Xiaomi. The biggest one is arguably that developing smartphones has become much easier, and companies no longer need a big research and development department.

"Virtually all phones are manufactured in China or Taiwan, and the ecosystem there is so ripe that everyone gets access to the same components and materials," Sanjay Kapoor, chairman at Micromax, explained in an interview earlier this year. "So if you manage your overheads right, you can build world-class products." 

MICROMAX YU YUPHORIA



AMD puts faith back in x86, downgrades ARM effort

AMD is recentering its server strategy around x86 after two years of focusing on ARM produced no results, writes [Agam Shah](#)



Two years ago, AMD tried to cut its reliance on the plodding x86 design by building server chips around ARM, the hot architecture driving mobile devices. That hasn't worked out, and the company is now putting its faith back in x86.

At a recent investor meeting on, AMD further delayed its ARM-based server chip, codenamed Seattle, and cut a major project that could have bridged the gap between its x86 and ARM chips. The company's executives also took responsibility for misreading the fast-growing server market, which is dominated by Intel x86 chips.

AMD is still developing ARM-based server chips, but instead of mainstream servers, those chips will now be aimed mainly at storage, networking and other infrastructure equipment. That's a downgrade from the company's focus over the past two years to make ARM servers the centrepiece of server rooms.

"A lot of people who are pro-ARM server misjudged just how much of an incumbent

advantage x86 had," argued Dean McCarron, principal analyst at Mercury Research.

Still relevant

ARM is still relevant, but for now, not as a mainstream server chip, said Forrest Norrod, senior vice president and general manager of the Enterprise, Embedded and Semi-Custom (EESC) Business Group at AMD.

"ARM will be important over time... But in the intermediate term, perhaps the more important and interesting opportunity is to capture that enterprise infrastructure that is moving to the server base," Norrod added.

Servers based on x86 dominate data centres, though ARM servers are drawing interest from companies such as PayPal for power efficiency. But ARM's slow adoption in servers has been compounded by chip delays and programming challenges.

AMD delayed the ARM-based Seattle chip, also called Opteron A1100, to the second half of the year. The chip was due in 2014, and the significant delay points to engineering

challenges AMD faced in making the chip, explained Jim McGregor, principal analyst at Tirias Research.

In addition, AMD cut Project Skybridge, an ambitious effort to develop a common slot so ARM and x86 chips could be interchangeable in servers. There wasn't enough interest in the capability, ARM CEO Lisa Su revealed.

While moving away from ARM, AMD recommitted to x86 by announcing new Opteron x86 server chips based on the faster and more power-efficient Zen architecture. The processors, which will ship in 2016 or 2017, are the first major x86 server chips announced by AMD in two years. AMD also announced a new high-speed chip that would combine many CPUs and GPUs.

AMD's laser focus on ARM over the past two years left the x86 field wide open for Intel, which pounced. Intel held a 98.5 percent share of x86 server chip shipments in the first quarter of this year, compared with only 1.2 percent for AMD, according to Mercury Research. AMD peaked in 2006 when it held a market share of 26 percent.

AMD shot to relevance in the early 2000s with server chips beginning with an Opteron processor codenamed Hammer, which was the first 64-bit x86 chip. It was hailed as a major innovation, and AMD hopes to bring back some of those glory days with the Zen-based server chips, which will have new memory and bandwidth technologies.

Despite a major x86 focus, AMD isn't completely giving up on ARM. New processors based on its homegrown ARM core, codenamed K12, will be released in 2016 or 2017. The decision to reinvest in x86 was strategic for AMD's new management team, which has limited resources to work with, McGregor said.

Su was appointed AMD's CEO in October 2014, and Norrod took over the server and custom chip team shortly thereafter.

The server business is a money spinner for Intel and can be for AMD, too. High-volume server chip shipments are in x86, not ARM, and refocusing there is a good decision by AMD, according to McGregor.

"The ARM server market is still developing," he added. ☒

ARM: Smartphone rivalry drives faster chip development

New mobile chips are now being developed at a yearly pace to line up with smartphone announcements. **Agam Shah** reports

Heated competition in the smartphone and tablet markets has required chip makers to speed up the pace at which they release new processors, Simon Segars CEO of ARM revealed in a recent interview.

Following in the footsteps of Apple, rivals including Samsung and HTC are upgrading their flagship devices on a near yearly basis, adding better displays, faster chips and more memory to entice customers into buying their products.

The company's designs the microprocessors used in most of those devices, and the increased competition means it's having to push out faster, more power-efficient chips at a quicker pace, the CEO revealed.

"We're always going to be looking to deliver more performance, make the best use of manufacturing technology... and deliver better system-wide efficiency," he added.

Rapid progress

ARM creates chip designs that it licenses to other companies such as Samsung, Apple and Qualcomm, who then tweak those designs for use in phones and tablets. A recent report from The Linley Group says that the company is making rapid progress on its next major processor design, which could turn out to be the quickest design upgrade it's yet produced.

The chip could be rolling off production lines by the end of next year and appearing in mobile gadgets soon after that, according to the report. That would mean it arrives just a year after its predecessor, the Cortex-A72, which was announced in March and is expected in devices at the end of this year.

The A72 also arrived sooner than expected, but it was a much-needed upgrade to its predecessor, the Cortex-A57. That chip was announced in 2012 and took two years to find its way into mobile devices - perhaps twice as long as the current chips.

Segars declined to comment on specific plans for the newest chip, but he acknowledged that ARM has been accelerating its design efforts. That's possible partly because ARM has more CPU designers than it had in the past, he said.



Beyond the CPU itself, ARM is looking at ways to improve memory and to speed up data exchange between components, he said.

ARM's yearly upgrade cycle mirrors that of Apple, which releases new A-series chips for its iPhones on a similar 12-month schedule. Apple's new chips typically include upgrades for the CPU, connectivity and graphics components.

The tech industry has grown accustomed to the pace at which vendors upgrade PC lines, which happens every 12- to 18 months. ARM is meeting the demands of a smartphone industry that's heading toward a cycle of six months to one year, explained Dean McCarron, principal analyst at Mercury Research.


Refresh cycle

The faster refresh cycle is the fruit of investments ARM made a few years back to help it stay ahead of Intel, its primary competitor, McCarron added. Intel's smartphone chips are used in just a few

handsets, but two years ago the company said it would upgrade its mobile chips faster in an effort to break ARM's dominance.

In 2014, Intel released new Atom chips codenamed Merrifield and Moorefield, and earlier this year it shipped chips codenamed Sofia for low-end smartphones. The Sofia processors were made in conjunction with Chinese company Rockchip, which has experience turning around processor designs in a matter of months, McCarron argued.

Next year, Intel will ship a high-end Atom chip called Broxton, which has a modular design that allows Intel to modify the chip and deliver updates at a faster pace. Broxton supports Intel's larger plan to deliver products that can be customised more easily, making its model more similar to that of ARM.

For now, the intense competition has resulted in new chips coming to market more quickly, but designing and manufacturing chips is a complex business, and it remains to be seen how long the yearly upgrade cycle will continue. 

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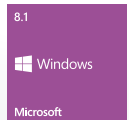


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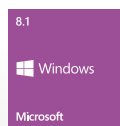


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This high-end gaming system includes a water-cooled Intel Core i7 4790K CPU overlocked up to 4.7GHz plus a 4GB NVIDIA GeForce GTX 980 graphics card, 8GB of 2133MHz Corsair Vengeance Pro DDR3, 250GB SSD for lightning quick gaming loading and a 2TB hard disk.



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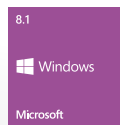


3XS Graphite LG1720 Gaming Laptop

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- Windows 8.1

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The LG1720 is a 17.3" high-end gaming laptop that includes a choice of powerful NVIDIA GeForce GTX 970M or 980M graphics card, ensuring silky smooth frame rates in all games. The LG1720 is ready for next-day delivery and has a 2 Year Warranty.



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Sony Xperia Z3+



Smartphone

We don't get the Xperia Z4 in the UK but Sony has confirmed the almost identical Xperia Z3+. As the name suggests, it's an update to the existing flagship phone in a slimmer frame including a waterproof USB port. It's now got a Snapdragon 810 under the hood and an upgraded 5Mp front camera.

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asus.com/uk



TomTom Bandit Action camera

Forget satnavs, TomTom is taking on GoPro with its new Bandit action camera. It shoots in various modes, including slow motion and timelapse at up to 4K resolution. With a lens cap, it's waterproof to 50m, and the free app will highlight moments in your video automatically.

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tomtom.co.uk

Kef M400 Headphones

We love Kef's M500 headphones but these are more affordable if your budget doesn't stretch that far. They still feature a lightweight design with comfortable memory foam pads and come in four colours, including Racing Blue. Perhaps most importantly are the 40mm full-range drivers to provide performance.

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Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



MICRO-PC

Acer Revo One RL85

Although the Acer Revo One is a PC, its pint-sized form factor means that it's also a rival to media streamers. Under the covers, it's a very different piece of kit but must still, to some extent, take on the Apple TV, Google Chromecast, Roku players and Amazon Fire TV.

Compared to those gadgets, the Revo One is expensive. They are all under £100 whereas the Acer starts at £239, while the top-of-the-range model will set you back £599. This means it also has to compete with mini PCs like the Mac mini.

So why would you want to pay so much more than those affordable gadgets? Well since the Revo One is a PC, it's not limited to certain apps. Roku players, for example, don't have Amazon Prime Instant Video. Using the web browser of your choice, you can watch anything via the Revo One - Blinkbox, Sky Go, Google Play, you name it.

Since it's running the Microsoft Bing version of Windows 8, you can do all the other things you'd normally do, too. You won't be able to run full-blown PC games at a decent framerate, but there is plenty of scope for casual gaming if you connect a wireless controller.

Acer isn't touting the Revo One for a particular room in the house and rightly so. You can easily plug it into your TV as you would a regular set-top box, put it in your study as a space-saving PC, or use it in the bedroom or even the kitchen.

If you are going to use it in your living room and connect it to a TV, you'll need the remote control in order to interact. This has a touchpad to move the cursor as well as handy buttons, such as one to launch the web browser. There's also a Qwerty keyboard on the rear. Most retailers ship the Revo One with this controller, though, some will supply a Bluetooth keyboard and mouse, so check before you buy. The controller doesn't connect directly to the machine, so you'll need to use one of the USB ports for the receiver.

The remote takes a little time to master, but you'll eventually get the hang of the way it. For general navigation it's quick, but gets fiddly when you need to interact with, for example, the EPG on Sky Go. Our main issues are that the

keyboard is awkward to use. You'll need to press the small buttons very firmly and the trackpad can be frustrating at times, making you wish you had a regular remote or a mouse.

Despite being so small, the Revo One has the potential to handle 6TB since it has three bays, which can take 2TB each. It can also double up as a NAS drive and supports RAID 0-, 1- and 5.

Inside is 11ac Wi-Fi (single stream) and Bluetooth, and there are plenty of ports on the back including HDMI, Mini DisplayPort (version 1.2 which supports 60Hz 4K output), two USB 2.0 ports, two USB 3.0 ports and ethernet. An SD card slot sits hidden on the top beside the notifications LEDs (three for each hard drive and one for network).

Three models are available. The entry-level option is priced £239 and comes with an Intel Celeron 2957U model with 1TB of storage. The £399 version has a 1.7GHz Core i3-4005U chip and 2TB of storage for £399. The higher spec model has a 2.2GHz Core i5-5200U, 8GB, 4TB of storage and a 60GB SSD. This sounds like a great setup, but will set you back £499.

Performance

Unfortunately, our review model isn't on sale in the UK but is close(ish) to the £399 option. It has a 2.1GHz Core i3-5010U, three 1.5TB SATA hard drives (2.5in) in a RAID 5 configuration and 8GB of RAM. Our benchmark results are for this model only and note that both are mobile processors, which are really with power consumption in mind rather than focusing on performance.

In our Geekbench 3 processor and memory test, the Revo One scored 1937 and 4106 for single- and multi-core speed respectively. This is a little way off the 2014 Mac mini, which has a 1.4GHz Core i5 and 4GB of RAM - it scored 2803 and 5401 points. In PCMark 8, we recorded scores of 1829 for the conventional test and 2200 for accelerated. Both are middle-of-the-road for a device with an Intel Core processor.




Although the Revo has a newer fifth-generation mobile Broadwell chip, it doesn't have a Turbo mode to hit higher clock speeds and that's likely to be the reason for lower scores compared to the Mac mini.

Our hard drive tests show the Revo One can read and write sequentially at 183- and 56MB/s, dropping to 99- and 52MB/s for network file transfer. It's the write speed that is the main worry here, which we'd like to see doubled. So using the Revo as a NAS drive will be fine for streaming content but you'll be in for some finger drumming while waiting for files to be uploaded. It's also worrying to see low speeds for small files which Windows uses a lot. 4K files read and write at 0.38- and 0.35MB/s respectively.

On the graphics side of things, using the built-in Intel HD Graphics 5500, we found the Acer managed an average of 29fps in Batman Arkham City at Medium detail and 720p resolution - a similar result to the Mac mini. That sounds promising but the minimum framerate was just 16, so there will be stutter. Even lowering the detail to low only raised these figures by one or two frames, so this isn't a gaming machine.

Verdict

The Revo One is one of the most interesting PCs we've seen and packs a lot of hardware into a tiny space. Unfortunately, in our tests, the Acer's performance was lower than expected.  **Chris Martin**

£419 inc VAT

Contact

■ microsoft.com/en-gb

Specifications

Windows 8.1; Intel Atom x7-Z8700 processor, quad-core 1.6GHz (turbo to 2.4GHz); up to 4GB DDR3 RAM; up to 128GB internal storage; 10.8in ClearType full-HD-plus (1920x1280, 214ppi, 3:2) multitouch display; USB 3.0; 802.11a/b/g/n/ac Wi-Fi; Bluetooth 4.0; Mini DisplayPort; 8Mp rear camera; 3.5Mp front camera; stereo speakers with Dolby sound; battery life up to 10 hours (video playback); 267x187x8.7mm; 622g (without keyboard) 1-year warranty

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



TABLET/LAPTOP

Microsoft Surface 3

Microsoft managed to keep the Surface 3 launch under wraps, so it was a surprise when it was announced earlier this year. Given that the Surface Pro 3 was the first such device we were able to recommend buying, a cheaper version should surely be good news.

The Surface Pro 3 is a great feat of engineering, but not everyone needs the power of a Core i7 for browsing the web, sending emails and creating documents in Office 365. So a Core M-based tablet running full-blown Windows 8.1 (rather than the hamstrung Windows RT) is what we'd been waiting for.

Unfortunately, that's not what we got. Instead, there's an Atom x7-Z8700, the first Cherry Trail processor to be seen in a tablet. It's a quad-core part, running at 1.6GHz but capable of boosting up to 2.4GHz when necessary.

This is the only processor on offer, meaning you have a choice of only four models: 64GB Wi-Fi for £419, 128GB Wi-Fi for £499, 64GB Wi-Fi + LTE and 128GB Wi-Fi + LTE. Currently there are no prices for the cellular versions, nor a set release date. The 64GB models have 2GB of RAM, while the 128GB versions have a more suitable allocation of 4GB.

There's also a microSD card slot for adding more storage, but with a full-size USB port, you can easily connect USB flash drives and hard drives for almost unlimited storage.

One of the great things about the Atom processor is that it doesn't require a fan for cooling, which means the Surface 3 is completely silent. Since that's what we've all come to expect from a modern tablet it's not a unique achievement by any means, but it's still welcome one.

The casing is made from the same magnesium as the Pro version, without the vents around the edge. Microsoft says it could have made the Surface 3 thinner, but chose not to in order to leave enough room for the full-size USB 3.0 port.

There's also a Micro-USB socket: another welcome feature as it means that you can charge your Surface 3 with any USB charger and Micro-USB cable. However, you're best off with the bundled power

supply, which delivers 2.5A (or 13W) and charges the tablet much faster than a phone charger can.

We're big fans of the front-mounted stereo speakers, which you can hardly see in the screen bezel. They sound better than you'd expect, because they're not shooting sound away from you like most tablets do with rear-facing speakers.

Unfortunately, you don't get the same infinite-position kickstand as the Surface Pro 3. The baby Surface clicks into three positions, the first two being the same angles as the Pro 3, and the third giving much more of a lean – ideal for sketching or annotating.

Display

One of the biggest attractions of the Pro 3 is its larger screen: 12.1in versus the 10.6in of the Surface Pro 2. It's still small by laptop standards, but just big enough to be usable for productivity and strike a good balance between size and portability.

The Surface 3's screen is a step backwards, though. At 10.8in, it's smaller than any laptop or Chromebook. Microsoft has changed it to a 3:2 aspect ratio, which makes the tablet nicer to use in portrait mode than 16:9 Surfaces as it's closer to the aspect ratio of paper. And since you can use the Surface Pro 3 pen with the Surface 3, those who want to draw or write will appreciate the more pad-like dimensions.

The resolution of 1920x1280 equates to a pixel density of 214ppi. That's not particularly high, but if anything we'd prefer a lower resolution on a display of this size. Usually we'd say the

opposite, but Windows doesn't scale well and at the default text size everything is tiny. If you're used to using Windows on a large or low-resolution screen, adjusting to the Surface 3 can take some time.

Having swapped a 15.6in office laptop for the Surface for the duration of the review, we've come to the conclusion that it's possible to use a 10.8in screen for work. It's just not that pleasant.

Microsoft says there are several reasons for making the Surface 3 smaller: to offer more choice, to give better battery life and to make it cheaper. So if you were hoping for a less powerful, cheaper Surface Pro 3, bad luck. This is arguably a better Surface 2 that can run legacy Windows programs, but it's not an alternative if you had your heart set on a 12in screen.

Another cost-cutting measure is the fact that you no longer get the pen in the box: it's a £45 option. As we said in our Surface Pro 3 review, it's a wonderful gadget. Tap the button on the end and OneNote will launch even if the tablet is in standby. A double-press takes a screenshot, after which you can draw a marquee to save only the portion you want and then annotate it before quickly sharing it.

Some people may not want the pen, so they'll save money but selling the Surface 3 without the keyboard makes even less sense than with the Surface Pro 3. Yet again it's an option, but no sane person would buy a Surface 3 and exclusively use the on-screen keyboard. The only reason you'd consider a Surface over, say, an iPad Air 2 is because you want





Windows. And Windows programs generally work best with a keyboard - not a fingertip.

It wouldn't be as much of an issue if the keyboard in question didn't cost £109, because without it, the Surface 3 is just a mediocre tablet. The keyboard may be backlit and come in a choice of colours, but this bumps up the price of even the base model to £530. If you don't already have pen and need one, this takes it to £575.

If Microsoft wants to offer more choice, a non-backlit keyboard would be a nice option to have, along with a £55 price tag. Better still, of course, would be to bundle a keyboard with the device.

At least it's a decent keyboard. Like the Pro's it has a double hinge, with a small section that's held against the screen bezel by strong magnets. This give the keyboard enough of an angle for comfortable

typing. Some people will find the keys too small, but we found touch typing was relatively easy. Only on the very odd occasion did a key fail to register.

When you don't need a physical keyboard, you can either fold it behind the Surface or rip it off completely. On its own, the Surface 3 weighs 622g and feels significantly lighter than the 800g Pro 3. However, it's

still much thicker and heavier than many tablets. Although its screen is over an inch smaller, the iPad Air 2 weighs almost 200g less and is nearly 3mm thinner.

And with the same palm-blocking technology as its big brother, it's comfortable to lean on the screen as you write with the pen.

Performance

There's no doubt that the Surface 3 has a good screen. It's an IPS panel that's bright and has good viewing angles. Being glossy, it's still highly reflective and not much use outdoors.

In our tests, it managed to produce the same gamut (range of colours) as the Surface Pro 3's screen with 90 percent of sRGB and 69 percent of the tougher Adobe RGB test. For colour accuracy, the smaller screen is slightly better than the Pro model, with a Delta E figure of 1.08, against 1.5 of the Surface Pro 3. Maximum brightness was measured at 366cd/m², and contrast at 660:1.

It may have a 'Full HD Plus' resolution, but it's not as high as the Air 2 or - if you prefer a comparison to a Windows laptop - Dell's XPS 13, which starts at £849.

Despite being the most powerful Atom processor available the x7-Z8700 is no powerhouse. It's fine for light duties (including basic photo editing) and we found it zipped along even with several tabs open in a web browser, plus Word and Excel running alongside.

However, it doesn't take much to find the limits. Switching between applications takes longer than most

average laptops and you won't want to wait the extra time it will take to apply complex effects in Photoshop compared to the Surface Pro 3. We wouldn't recommend a Surface 3 for video editing, either.

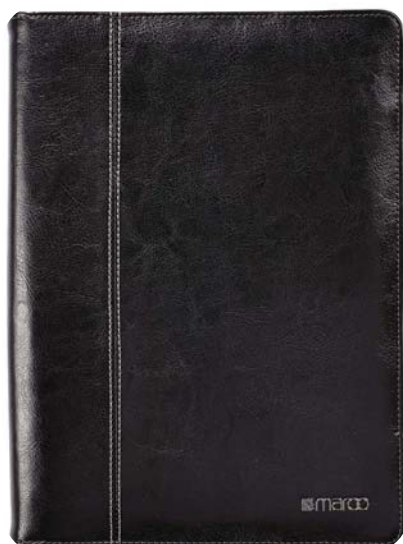
In the PCMark 8 Home test, we saw a result of 1383 without hardware acceleration. This compares poorly with the Core M processor in the Asus ZenBook UX305F, which scored 3424. In the Work section, the Surface could manage only 1557, while the UX305F scored 3312.

It's a shame Microsoft went with the Core M instead of the Atom.

Batman: Arkham City refused to run, citing an "unhandled exception", but we did manage to get Tomb Raider going. When set to the usual start-point setting of 1280x800 and Normal detail, the Surface 3 averaged 15fps. Dropping the resolution to 1024x768 and Low detail saw an increase to 28fps. Again, the Core M shows its prowess here with a score of 31fps at 1280x800. With a few tweaks, it's possible to get smooth frame rates on the ZenBook, but you have to sacrifice too much on the Surface.

We test tablet battery life by playing an HD video on loop from our Synology NAS, first setting the screen brightness to 120cd/m². The Surface 3 lived up to Microsoft's claims by lasting just over 10 hours before needing a recharge.

There are front- and rear-facing cameras, the former having 8Mp and the latter 3.5Mp. The front camera is perfectly fine for Skype chats, and the rear delivers acceptable photos in emergencies,



but we can't imagine many people feeling comfortable holding up such a large device whenever they want to take a snap.

A small incentive to buy a Surface 3 is that you get a year's free subscription to Office 365 Personal, which would otherwise set you back around £60.

The disadvantage, common to all Windows tablets, is that Windows 8. If you were planning to use the Surface mainly as a tablet, you won't enjoy it as much as an iPad or Android device. Part of the issue is the interface, which isn't as slick or intuitive, but a bigger problem is the apps. Even when you can get the one you want, it's usually inferior in quality or features (or both) to the iOS or Android version.

While we were testing the Surface 3, Maroo sent over its brand new Surface 3 Folio to try out (pictured bottom left). We mention it because your options are severely limited if you want a


case specifically designed for the Surface 3, and the cases are sold directly from Microsoft's website alongside the tablet.

Sure, you can buy a generic sleeve (Maroo also makes these for the Surface 3) but with the Folio you can protect your tablet and keyboard. Like previous Surface cases from Maroo, you can't use the tablet's kickstand, so the Folio has a built-in stand that flips out to around 40 degrees. It adds a fair amount of weight, which is a disadvantage, but it's not expensive at £39. It's made from synthetic leather and a woollen material.

Verdict

Objectively, the Surface 3 is the best compromise between a laptop and tablet. It's a highly portable gadget that can run full Windows programs, and it costs less than the Surface Pro 3. It's



not exactly cheap by the time you've added the keyboard and stylus, though. It's also only good for lightweight duties - it's less powerful than laptops costing the same - and some people will find the screen is too small for 'proper' productivity. It's a better work tool than an iPad and Bluetooth keyboard, it has to be said, and if you only need to use office apps and a web browser, it could be exactly what you're after. Most people are better off spending more on the Surface Pro 3 or, if you don't need a touchscreen, a Core M laptop such as the Asus UX305F.  **Jim Martin**



£1,320 inc VAT

Contact

■ hp.com/uk

Specifications

15.6in (1920x1080, 141ppi)
IPS matt anti-glare;
Windows 7 Professional;
2.6GHz Intel Core
i7-5600U (32. GHz Turbo)
2C, 4T; AMD FirePro M4170
with 1GB GDDR5/Intel HD
Graphics 5500; 16GB (2x
8GB) 1600MHz DDR3 RAM;
256GB SSD; gigabit
ethernet; 802.11a/b/g/n/ac
2x2 MIMO; Bluetooth 4.0;
optional 4G LTE module;
4x USB 3.0; 1x DisplayPort
1.2, 1x VGA D-Sub;
Kensington lock slot, HP
FingerPrint sensor; SDXC
card slot, smart card
reader; stereo speakers;
0.9Mp webcam; dual mics;
3.5mm headset jack;
104x65mm, 2x three
buttons, trackpoint;
50Wh lithium battery;
375x253x24.5mm; 2045g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



LAPTOP

HP ZBook 15u

Now that HP has migrated its mobile workstation laptops from EliteBook to ZBook, we find two distinct versions of the 15in workhorse.

The regular ZBook 15 G2 is closer to the original brick-built EliteBooks, around 40mm thick and bending the scale needle close to 3kg - although that's still a trim and toned-up take on the classic bombproof mobile power laptop.

Coming in at a little over 2kg and just under 25mm thick, the new 15u is the more fashionable variation of ZBook. The added U in the name seems to point to Ultrabook, Intel's for a MacBook Air-style ultraportable running Windows.

The 15u appears to be in its second generation (G2) although since this is a brand new product we suspect the suffix was added so it wouldn't look out of date next to the revised G2 version of the ZBook 15. While far from emulating the carry-anywhere sub-20mm, sub-1.5kg notebooks of today, it's relatively compact form puts it alongside other thin and light workstation notebooks such as the 15in Apple MacBook Pro and Dell Precision M3800 (page 40).

Build and design

The case is almost entirely constructed from metal, a lightweight cast alloy for the main chassis, with metal top plate around the keyboard and lid back. The 15.6in widescreen display with matt anti-glare finish is available as either a budget TN or higher-grade IPS version, both at 1920x1080 resolution. There's no option for a touchscreen display, arguably a wasteful frippery on a professional mobile workstation.

On the left side is the exhaust outlet for the single internal cooling fan, a VGA D-Sub video port, two USB 3.0 and a slot for smart cards. Along the right there's a 3.5mm headset jack, full-size DisplayPort 1.2, another two USB 3.0, gigabit ethernet (with sprung flag, to



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help fit into the slim edge), DC power inlet, and a docking slot. There's no underside docking-station port as you'd find on most business laptops, but HP promises to supply an adaptor to fit this side port with two more digital video outputs. Missing from the port line-up is the Thunderbolt 2 port now found on the non-U second-generation ZBook 15.

The entire case bottom is easily removable from one slide-release button, providing access to most of the upgradable components such as memory and wireless connectivity.

Our sample had 16GB of memory on two 8GB SO-DIMM modules and a PCIe-attached M.2 SSD, 256GB in size. You can add a 4G LTE module, access the 802.11ac mini-PCI card and change the 50Wh battery from here too. Even with the solid-state drive fitted, there's also space to add a 2.5in SATA drive.

For main processor duties, this model had a new Broadwell series 2.6GHz Intel Core i7-5600U, and unusually for a notebook billed as a professional workstation, this is a dual- rather than quad-core chip. This is the top specification, with an option on the 2.4GHz version of the same chip (5500U).

HP explains that thermal issues prevented it from fitting a quad-core processor into this relatively thin case. In contrast, both Apple

and Dell do use quad-core Intel Core i7 mobile processors in their counterparts, although the latter at least can suffer from cooling issues, requiring its fans to rev up to high speed to keep internal temperatures within limits.

For graphics processor there is a choice of just the integrated Intel HD Graphics 5500 from the Intel CPU, or this with an additional AMD FirePro M4170 dedicated GPU. Unlike the fat ZBook 15, there's no nVidia option here.

The AMD FirePro includes 1GB of GDDR5 memory, and is designed to switch into action when required with AMD's Enduro Technology, a rebrand of its Dynamic Switching Graphics (DSG) system.

At time of writing, the only variants of the ZBook 15u G2 we could find offered from the HP UK website were without discrete AMD graphics, and up to 8GB of system RAM only. With the lower 2.4GHz processor, integrated graphics powering the IPS display, and 256GB Z Turbo Drive (HP's name for the PCIe-attached SanDisk SSD), the ZBook 15u G2 is priced at £1,320 (inc VAT).

Performance

In Geekbench 3, the ZBook 15u G2 averaged 3281 points in single-core mode, and 6862 points multi-core. The quad-core chip in the non-U ZBook is clocked 0.1GHz slower, but scored 3472 and 12,914 points respectively.

Cinebench 11.5 rated the ZBook 15u G2 with 1.50 and 3.38 points for each mode, while v15 of the graphics rendering benchmark scored it

The entire case bottom is easily removable from one slide-release button, providing access to most of the upgradable components such as memory

with 131 and 309 points. Its big brother scored 1.55 and 7.1 points in the former test; and 137 and 655 points in the latter.

So given the measurably superiority of the quad-core machine, a closer point of comparison for the ZBook 15u G2 may be the 13in version of the MacBook Pro with Retina display, since that uses a similar dual-core Broadwell chip.

Running OS X, this scored 1.37 and 3.37 points in Cinebench 11.5, and 127- and 318 points in Cinebench 15, using a 2.7 GHz Intel Core i5-5257U processor and faster 1867MHz memory. In other words, slower on single-core tasks, but equal or faster in multi-core mode.

The animated test scene played at 44.4fps in Cinebench 11.5, and 40.8fps in Cinebench 15. Those results are some way behind what the regular ZBook 15 can do, scoring 69.4- and 69.9fps here, using its more powerful AMD FirePro M5100 graphics processor.

HP has done well to build a lighter weight 15in mobile workstation laptop with much of the strength and integrity of its traditional models

The PCMark 8 Home test returned just 2937 points, rising to 3631 points with GPU acceleration, while the Work test showed a bigger improvement between standard and accelerated modes, with 3108- and 4489 points respectively - a 44 percent boost in scores here by leveraging the AMD graphics.

Game on

Although the ZBook 15u wasn't designed for entertainment, we still tried a few of our standard gaming tests to get a feel of its capabilities. Batman: Arkham City would play at native screen resolution of 1920x1080 at an average framerate of 53fps, when set to High detail. At Very High detail this dropped to a still playable 46fps, but the next step of Extreme detail halved its playback to just 23fps.

We thought we might see better in Tomb Raider 2013 since this often



plays better with AMD graphics, but found that even Normal detail only allowed 31.5fps. High detail scuppered gameplay at 23.5fps, while Ultra and Ultimate stuttered along at just 17- and 7fps respectively.


Metro: Last Light was similarly unplayable with our usual 1080p settings of High and Very High,

24.2- and 81.4MB/s for reads and writes, rising at queue-depth 32, to 213- and 175MB/s.

Battery

The ZBook 15u's battery of the is sealed behind the removable bottom plate, but can be removed quite easily if required. At 50Wh, it's a mid-range capacity, and in our standard looped-video rundown test allowed the laptop to run for six hours 14 minutes, with screen set to 120cd/m². That's an appreciable step-up from typical Windows workstation laptops, if much shorter than you can expect from the comparable 13in MacBook Pro with its Broadwell chip, which runs for up to 17 hours in the same test

Verdict

HP has done well to build a lighter weight 15in mobile workstation laptop with much of the strength and integrity of its traditional models that are far less mobile in real terms. Sacrifices have been made to the main CPU by fitting dual-core rather than quad-core, and the AMD GPU is a middleweight part rather than fire-breathing FirePro. But importantly, the 15u runs cool and quiet enough not make itself a nuisance, even under load. Assuming the version we tested will cost under £2,000, it could provide decent value, majoring on resilience more than style and sheer performance, but well enough equipped to prove attractive to the target professional audience.  **Andrew Harrison**

returning average framerates of just 19- and 5.7fps.

Display

The IPS display in our sample was a Samsung SDC5344 panel, with good colour gamut up to 99 percent sRGB, and 75 percent of Adobe RGB. Contrast ratio was around 550:1, rising to a peak of 700:1 at full brightness (300cd/m²).

Colour accuracy ranged from 0.22 to 4.52 Delta E, with an average Delta E figure of 1.29.

Storage

The SanDisk A110 M.2 SSD takes a PCIe connection, enabling storage performance to break through the SATA limit, if only by a relatively small margin. Using CrystalDiskMark on the C: boot drive, we saw sequential speeds of 639MB/s for reads and 557MB/s for writes. Small 4kB random IO was fast at



£483 inc VAT**Contact**■ acer.co.uk**Specifications**

15.6in (1366x768) TN matt anti-glare ('ComfyView'); 1.7GHz Intel Core i5-4210U (2.7GHz Turbo) 2C,4T; Intel HD Graphics 4400; 4GB (1x 4GB) 1600MHz DDR3L; 500GB 5400rpm SATA HDD (ST500LT012-1DG142); gigabit ethernet; Intel Wireless-N 7260; Bluetooth 4.0; DVD-RAM (Matshita UJ8E2Q); 1x USB 3.0, 2x USB 2.0; HDMI, VGA D-Sub; SD card slot; stereo speakers; 0.9Mp webcam; 3.5mm headset jack; UK tiled keyboard with number keypad; buttonless multi-touch trackpad; 55Wh lithium-ion, removable battery; 40W mains charger with C5 inlet; 380x254x25.2mm (29.8mm with battery); 2301g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**LAPTOP****Acer TravelMate 256-M**

The Acer TravelMate 256-M is a no-nonsense 15in laptop aimed at business users. It may be low in frills, but it packs the essentials, and costs under £500.

To earn its keep as a business tool, a laptop needs to have a certain durability, and here the TravelMate feels as though its up to the job. The chassis is tough black plastic lid back and top deck - smooth and fingerprint wipeable - and a matt textured plastic underside. There's no give in the body, although the lid/display assembly flexes a little when twisted.

Crucially there's practically no bending across the top deck and wrist-rest area, giving a firm foundation to mount the excellent keyboard. This has rough textured key tops, likely to polish smooth after use, but when new is easy to work with, helped by the smooth, consistent action of the medium-travel Scrabble-tile keys, with number keypad to the right.

There's no complaint with the buttonless trackpad either, which is unusually easy to steer accurately for a budget laptop. We did find that cursor speed was too slow though, even with Windows and Synaptics adjustments set to maximum.

On the left side are two video ports, HDMI and VGA, plus gigabit ethernet, one USB 3.0 and a 3.5mm headset jack. Over on the right are two more USB, only USB 2.0 spec though, the DC power inlet, and an increasingly rare sight on any computer - a DVD drive. This Matshita multi-format optical drive can read and write to various discs, including dual-layer and DVD-RAM.

From below you can easily remove the 55Wh lithium-ion battery, even if the usual trapdoors to access memory and hard disk are absent. The TravelMate 256-M is fitted with 4GB of memory and a 500GB hard disk, and these should be upgradable after removing the entire bottom plate.

Performance

Our sample of TravelMate had a 1.7GHz Intel Core i5-4210U dual-core processor. It includes Hyper Threading Technology to work like a quad-core, and Turbo Boost up to 2.7GHz; although we found some



online retailers selling under the same product code with the previous Core i5-4200U processor clocked at 1.6GHz. We suspect in actual use there will be little appreciable difference in performance.

Geekbench 3 scored the processor and memory with 2517 points running single-core, and 4863 points for multi-core mode. The professional Cinebench 15 test returned similar decent results of 104+ and 241 points, well below those of a professional workstation notebook but suggesting ample raw power for crunching through office programs and some creative media work. In the OpenGL rendering test, the Acer average just under 21fps.

PCMark 7 scored the Acer with 2443 points, and PCMark 8's various sub-tests also gave middle-of-the-road results: the Home Conventional test showed 2159 points, rising to 2229 when accelerated by the Intel chip's integrated graphics processor. The Work section showed clear advantages to using OpenCL-optimised programs though, rising from 2692- to 3305 points. These results were compromised by the relatively slow storage technology, since PCMark gives an all-round system speed check that also evaluates drive speed.

Turning to the hard disk, Acer has installed the traditional 2.5in SATA hard disk, a Seagate drive spinning at 5400rpm. While slow, you do at least get the advantage of a sizable volume to store data. In our tests, it could read and write at around 108MB/s, falling to 22- and 41MB/s with 512kB files; and then tumbling to just 0.41- and 0.76MB/s with small 4kB random files. This will be the main reason why Windows feels more sluggish than normal.


As a quick measure of the capability of the Intel HD Graphics 4400, we tested with Batman: Arkham City, where the TravelMate averaged just 22fps at its native low 1366x768-pixel resolution and Medium detail. By dropping resolution to 1280x720 and detail to Low, it mustered an almost playable 28fps, albeit with 15fps minimum.

Display quality is one area where laptop makers cut corners, and the TravelMate P2 was no exception. It takes a budget twisted-nematic (TN) technology screen, with poor viewing angles, restricted colour gamut and low contrast ratio. Tilting the screen back a few degrees beyond optimum and the image soon disappears into a dark mess.

Contrast ratio was a low 90:1, leading to milky colours and light-grey blacks, while colour gamut incorporated just 65 percent of the basic sRGB colour space. Colour accuracy measured 2.28 Delta E, where better quality screens hit 1.0 or less deviation. That said, the display was usable enough and benefited from calibration to bring its colours out of the washed-out blue to slightly more natural tones.

Such basic low-res TN panels are more frugal in power requirements, and helped the TravelMate last for a useful eight hours 26 minutes in our standard looped-video rundown test. At 2.3kg, the Acer is not a featherweight but combined with the good battery life it should make a much better travelling tool than other short-lived laptops.

Verdict

The Acer gets all the basics right, with decent battery life, good performance and a sturdy, robust feeling chassis.  **Andrew Harrison**

£215 inc VAT**Contact**■ asus.com/uk**Specifications**

10.1in (1920x1200) 224ppi
IPS gloss touchscreen;
Windows 8.1 with Bing
(32-bit); 1.46GHz Intel Atom
Z3775 (2.39GHz Burst) 4C,
4T; Intel HD Graphics; 2GB
1333MHz LPDDR3; 64GB
eMMC (Samsung MCG8GC);
802.11a/b/g/n 1x1; Bluetooth
4.0; 1x Micro-USB 3.0, 1x
Micro-USB 2.0; Micro-HDMI;
microSDXC card slot;
stereo speakers; 2Mp front,
5Mp rear cameras; dual
array mics; 3.5mm headset
jack; UK tiled, Bluetooth
wireless keyboard;
buttonless trackpad,
87x45mm; 30Wh
lithium-ion polymer
battery; 10W USB charger;
264x174x17.2mm (7.7mm
tablet); 1101g (566g tablet)

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**TABLET/LAPTOP****Asus Transformer Book T100 Chi**

Asus has re-energised its Transformer T100, quite literally by adding Chi to its name. Besides the rebranding, the Windows tablet also gains a newer Intel Atom processor and various other small tweaks.

The Asus arrives in its box like a regular clamshell folding laptop, albeit a very small one with 10.1in screen. The unit actually comprises two parts – a Windows 8 tablet and a snap-on keyboard assembly. When docked together, you get some of the benefits of a real laptop, such as mechanical keyboard and finger trackpad, although screen angle is more limited in its tilt, almost certainly to prevent the back-heavy unit from toppling over backwards.

Construction quality is good, with both tablet back and the entire lower keyboard section made from anodised aluminium; this was finished in dark blue on our sample, with a polished bevelled edge detail.

In contrast to the earlier version, the keyboard connects to the tablet only by Bluetooth. Asus has set aggressive power management here, which turns off the keyboard after just a few minutes left idle. This leads to delays whenever you go to use keyboard or trackpad after a moment away, as you must wait for the radio link to wake up and re-establish, a process that can take several frustrating seconds.

With the tablet and keyboard sections as two electrically unconnected items, you must also charge them separately, each through their own Micro-USB 2.0 ports. The keyboard is very frugal in its power consumption, lasting for days and charging inside of an hour. The same is not true of the tablet, and we found it could take two hours on charge with a flat battery before we could even turn the device on. To complete the charge to capacity took around eight hours using the supplied 10W USB charger, which is a ridiculous time to wait.

The tablet has a 10.1in IPS glass-fronted touchscreen with 1920x1200-pixel resolution, giving it a more useful 16:10 aspect ratio than the usual Android and Windows tablets. Pixel density is relatively high at 224ppi, giving clean and sharp definition. The OS



interface is set by default to 150 percent scaling to make the Windows desktop more sensibly sized.

There's the usual inevitable problems trying to run Windows by fingertip. The standard Windows environment is barely navigable through touch, leaving just the moribund Metro interface and its dearth of useful applications.

Two USB ports are included, a Micro-USB 2.0 and 3.0. Also available is a microSDXC card slot and Micro-HDMI video port. Tiny speakers are sited either side for stereo, and volume is adjusted by a rocker switch on the left.

Components

Powering the T100 is a 1.46GHz quad-core Intel Atom processor, specified with a Burst mode to 2.39GHz. This is now a 64-bit processor even if Asus supplies the Transformer with a 32-bit version of Windows 8.1 with Bing, the economy edition that at least tends to garner less bloatware out of the box.

Memory is just 2GB and not upgradable, rated at 1333MHz. For storage there's an internal 64GB flash drive, not a laptop-style SATA solid-state drive but eMMC.

This flash drive provides performance roughly comparable with a 2.5in hard disk in its sequential read speed, and half that speed in sequential writes.

For wireless connection there is Bluetooth 4.0 and 11n Wi-Fi but there's no option for cellular internet connectivity. There are cameras fore and aft, specified as 2- and 5Mp.

The older Transformer Chi scored 2330 points in PCMark 7

with its 1.33GHz Atom processor and the same memory quota. The new Chi model showed a 17 percent increase, to 2741 points, while PCMark 8 Home returned a relatively poor result of 1223 points (1225 points in Accelerated mode). The Work module of PCMark 8 saw a large drop in score when moving from Conventional to Accelerated mode (1550- and 1236 points respectively), which shows the weak graphics processor is little help for OpenCL-compliant programs.

Where the Transformer also falls down is in graphics performance. In the Batman: Arkham City benchmark, it averaged 18fps when set to an easy resolution of 1280x720 and Low detail. At the same settings, Tomb Raider 2013 also limped along at the same unplayable 18fps framerate.

Storage speed from the eMMC card was mixed, up to 123MB/s for sequential reads but just 59MB/s for sequential writes, according to CrystalDiskMark. Testing 4kB random data performance, we measured around 20MB/s reads and 16MB/s writes, rising to just 40- and 19MB/s when attempting a higher 32-thread queue depth. So usefully, it is faster than a hard disk when it comes to small file transfers.

Verdict

Promoted as a 2-in-1 tablet and laptop solution, the Transformer Book T100 Chi looks smart and we can't fault build and finish quality at the price. However, it is compromised as a laptop, and as a tablet it fails to be any more endearing than every other unloved Windows tablet. ☒ **Andrew Harrison**

£1,978 inc VAT

Contact

■ dell.co.uk

Specifications

15.6in (3840x2160) IGZO touchscreen (Sharp LQ156D1); Windows 8.1 Pro; 2.3GHz Intel Core i7-4712HQ (3.3GHz Turbo) 4C, 8T; nVidia Quadro K1100M with 2GB GDDR5/Intel HD Graphics 4600; 16GB (2x 8GB) 1600MHz DDR3 RAM; 256GB mSATA SSD; Intel Wireless-AC 7260; Bluetooth 4.0; ethernet with supplied USB 3.0 adaptor; 2x USB 3.0, 1x USB 2.0; HDMI 1.4; Thunderbolt 2.0; Noble lock slot; SDXC card slot; stereo speakers; webcam; built-in mic; 3.5mm headset jack; buttonless multi-touch trackpad, 105x80mm; 61Wh lithium battery, non-removable; 130W mains charger with C5 inlet; 372x253x19mm; 1951g

Build: ★★★★★☆

Features: ★★★★★★

Performance: ★★★★★☆

Value: ★★★★★☆



LAPTOP

Dell Precision M3800

When Dell launched the Precision M3800 in late 2013, we felt we knew which laptop it wanted to compete. Dell followed the essential layout of the Apple MacBook Pro with Retina display, the 15in model with discrete graphics, making a lightweight mobile workstation just 19mm thick. And it added a few twists of its own, propelled by Microsoft's unflinching belief that what everyone wanted on their notebook computer was touchscreen control and Windows 8.

This year, the M3800 has been gently updated, now featuring a glass-fronted screen with a higher UHD resolution of 3840x2160 pixels, and a slightly faster Haswell-generation Intel Core i7 processor. Confusingly, Dell doesn't seem to have changed the model designation, and as with Apple's naming convention still references this model as the Precision M3800 (late 2013). As it turned out, despite the 100MHz speed bump for the CPU, in our tests the current model proved no faster than the last time we tested it; and in some respects was slower.

The Precision M3800 is designed as a premium 15.6in workstation laptop, packing an Intel quad-core processor and nVidia Quadro graphics. The case is made from a mix of metal, carbon and plastic, with aluminium lid back and chassis frame, carbon-fibre bottom and a plastic top deck.

It is well equipped with ports and connectors, including two USB 3.0 and one USB 2.0 port, HDMI, an SD card slot and 3.5mm headset jack. This year's updated model also now sees the addition of a Thunderbolt 2 port, Intel's high-speed data bus developed for Apple that is now specified for 20Gb/s operation. This Thunderbolt port doubles as a Mini DisplayPort 1.2 connector, the only means to connect to an external UHD 4K display at full 60Hz refresh rate.

Besides these ports ranged down the left and right sides, there's also a security lock slot, and a battery level indicator, which lights with up to five small white LEDs when you press a tiny button. The internal battery is relatively small at 61Wh, and is not user replaceable.



Components

With tumbleweed blowing through the streets that should have been touting new Intel mobile quad-core processors from every stall, Dell is also forced to use a main processor from a series that's two long years old. Replacing the 2.2GHz Intel Core i7-4702HQ is a 2.3GHz Core i7-4712HQ, a tiny 0.1GHz clock speed increase, and uses the same Intel HD Graphics 4600 as the low-power graphics processor.

For best graphical performance, there is also the same nVidia Quadro K1100M GPU, keeping the 2GB GDDR5 video memory specification from before.

Main memory stays at 16GB, two 8GB DDR3 cards running at 1600MHz. And storage comprises the same capacity 256GB mSATA SSD, although our new sample has a Samsung SM841N flash drive, effectively an OEM version of the Samsung 840 Pro SSD. This replaces a Lite-On (Plextor) mSATA SSD. And where the last generation also included an additional basic 2.5in SATA hard disk for bulk storage, this new model was supplied with just the single flash drive. That could explain why this new model weighed 1.95kg, against the 2.04kg of yore.

For network connections, there is no built-in ethernet although a USB 3.0-to-gigabit-ethernet adaptor is included in the box. For wireless links there's the usual Bluetooth 4.0, and a two-stream 11ac Wi-Fi adaptor from Intel.

The keyboard is solid enough for sustained typing, notably omitting the right-hand numberpad that most 15in Windows laptops include to help fill the deck

space. Instead Dell has copied the plan of the MacBook Pro again, usefully allowing the trackpad to be correctly centred on the top deck rather than uncomfortably offset to the left.

The trackpad is buttonless, smooth and black, with almost the same rubbery texture as the top deck. In use, it proved suitably precise to allow easy navigation and mouse steering. Two-finger scrolling is of the 'natural' type pioneered by Apple by default, where the fingers follow the direction of intended movement.

Stereo speakers are hidden below the front edge of the chassis, and are perhaps the loudest we've heard on any laptop when turned up. More pertinently, the sound quality is not too bad either, showing clear treble extension and less of the grit and tinniness that usual comes with laptop territory. Importantly the midband is relatively clean and intelligible for good vocal diction.

The display has been increased in resolution from the original 3200x1600 pixels, to 3840x2160. You could look at these as 'quad 1600x900' and 'quad 1920x1080' screens respectively. Again this is an IGZO technology panel made by Sharp, using indium, gallium and zinc oxide to form the thin-film transistor matrix.

In size, the Precision M3800 15.6in display is smaller than the 15.4in display found on the MacBook Pro, since Dell has selected a narrow 16:9 aspect-ratio widescreen designed for consumer products. Mounted in its bezel, there is wasted space above and below the screen which could have

been usefully taken by a more versatile 16:10 aspect display.

This display has been built as a multi-touch touchscreen, with an aluminosilicate glass panel bonded to the front like Apple's Retina displays. However, there is no reflection-reducing coating applied here, resulting in a particularly reflective glass sheet. To avoid excessive narcissism, you could try changing the default dark-coloured Dell wallpaper to something lighter to help hide the mirror effect.

With Windows 8 set at 250 percent scaling out of the box, the interface is very clean and sharp, with precisely detail typography. There is the usual problems with Windows programs though, some of which do not respect the enlargement so appear minute onscreen; or other programs that do render at the correct size but with fuzzy text and windows.

In use, we found the internal cooling fans were not as loud as we remembered from the first generation model. Handling of the M3800 is not as comfortable as it could be, with the weight distributed toward the hinge from the heavy touchscreen display. Got to lift the lid open on the desk, for instance, and the bottom half of the laptop comes up with it unless you press it back down.

Performance

With GPU, memory, OS and storage technology remaining the same, we would expect a fractional increase in performance to be picked up in benchmark tests, owing to the 100MHz uptick in CPU clock speed. That's a 4.2 percent faster chip in clock terms, although we cannot automatically expect a direct increase by the same percentage in benchmark scores.

Geekbench 3 scores single-core and multi-core processor and memory performance only, and here returned numbers of 3269 and 11,760 points respectively. The previous 2.2GHz model scored 3238- and 11,553 points, giving around 1- and 1.8 percent increases here.

PCMark 8 scored the Dell with 2524 points in the conventional Home test, 4.5 percent slower than the older model's 2643 point result. Using the Accelerated test and the benefit of OpenCL, it scored 2517

points - 4.7 percent slower than the older 2642-point result.

Turning to the Work module of PCMark 8, we also saw around 5 percent slower results, namely 2660 points Conventional (down from 2801 points); and 3260 points Accelerated (was 3443 points).

Cinebench 15 was kinder to the new Precision M3800 of 2015, with 125 points single-core and 593 points multi-core (up around 6- and 10 percent from the older model's 118 and 541 points). Both generations of M3800 rendered at 50fps in the benchmark's OpenGL test.

For reference, last year's 15in MacBook Pro with 2.2GHz processor scored about the same here, returning 121- and 593 points respectively.

We tried some graphics gaming tests, and found Batman: Arkham City could play at 1920x1080 and Normal detail with an average framerate of 31fps. Tomb Raider 2013 was not really playable, as setting screen resolution to 1920x1080 resulted in a tiny windowed image. Meanwhile back at native 3840x2160 resolution, the game now filled the screen, but the ultra-high resolution brought the nVidia Quadro K1100M graphics to a stuttering 9fps.

Display

The IGZO technology LCD has similar image properties as that found on good IPS screens. Using a Datacolor colorimeter we measured 100 percent coverage of sRGB gamut and 77 percent Adobe RGB.

Contrast ratio was around 700:1, peaking at 740:1 at full screen brightness. Maximum brightness was not especially high though and we couldn't coax more than 248cd/m² from this laptop. Colour accuracy was outstanding, with an average Delta E of 0.77.

Storage

While many performance laptops successfully use PCIe-attached flash drives, the M3800 is limited by its slower SATA SSD. The Samsung mSATA drive here is perhaps the fastest of the old breed though, with sequential reads at around 500MB/s, and writes at 412MB/s.

Small-file transfers were very quick, with 4kB random reads at 24MB/s and random writes at

62MB/s. When multiple threads are stacked up to a depth of 32, these figures rose to 401- and 337MB/s respectively, suggesting a peak IOPS performance of 102,000 IOPS with random reads.

Battery

Dell has not improved the dreadful battery life of the M3800 since the last generation. It has the same 61Wh lithium battery, now asked to power an even higher resolution screen and faster-clocked CPU. Using a simple looped-video rundown test over Wi-Fi, we measured three hours 24 minutes from this model, just behind the three hours 33 minutes of before.

It's also important to realise that like many Windows laptops the Dell suffers from battery issues even when not in use. Over a 40-hour period of sleep, the battery had depleted exactly to 60 percent capacity, suggesting around 1 percent of battery reserve is drained per hour of sleep. At that rate, if you returned to the Dell four days after leaving it in sleep with a full battery, you'd find your laptop entirely dead and needing a complete recharge.

Verdict

The Precision M3800 is Dell's take on the 'Ultrabook' portable workstation notebook. In its favour, the quad-core processor and midrange pro-certified graphics chipset provide useful performance. This year's model now has a UHD 4K display although this still serves to exaggerate problems in some Windows programs. Ultimately, the Dell's battery life means the M3800 is seriously compromised as a mobile productivity tool.

✉ **Andrew Harrison**



£500 inc VAT**Contact**■ lg.com/uk**Specifications**

Android 5.1 Lollipop; 5.5in IPS Quantum (1440x2560, 538ppi) Display Quad HD; Qualcomm Snapdragon 808, six-core (dual-core ARM Cortex A57 and quad-core A53 with 64-bit support; Adreno 418 GPU; 3GB RAM; 32GB internal storage; microSD card slot; 16Mp rear camera with OIS 2.0 and f/1.8; 8Mp front camera with f/2.0; 11ac Wi-Fi; Bluetooth 4.1 LE; NFC; 4G LTE; 3000mAh removable battery; 76x149x6.3-9.8mm; 155g

Build: ★★★★★☆
 Features: ★★★★★☆
 Performance: ★★★★★☆
 Value: ★★★★★☆

**SMARTPHONE****LG G4**

After a no-show at MWC 2015 back in March, we've had to wait a little while for the G4. However, LG's flagship phone is finally here. We were impressed with the G2 and G3, so the G4 has a lot to live up to and faces fierce competition from rivals.

Despite rumours of a metal cover, LG has opted for leather instead, which is unusual as a main option. It fits comfortably in the hand, and is preferable to the faux leather found on some Samsung devices. Three colour options are available: brown, black and red. It's worth noting that although the leather has been vegetable tanned, the colour will change over time. We've no idea how the leather case will stand up to day-to-day use. You'll need to pay around £25 extra for the leather handset.

If the idea of a leather handset doesn't appeal, LG offers a ceramic case, which has a smooth diamond texture. It's available in Metallic Gray, Ceramic White and Gold. We weren't, however, impressed with the ceramic case, which feels plasticky in the hand.

On the plus side, the cover is removable, giving you access to the battery and microSD card slot. We're therefore hoping to see third-party case makers offer some stylish alternatives to LG's range.

The G4 looks similar to its predecessor, the G3, apart from the switch to leather and ceramic. However, it's a shame that LG hasn't slimmed down its flagship phone. It's heavier at 155g and thicker at 9.8mm, which isn't ideal. We were also hoping for the phone to be thinner on the width as the G3 is a tad difficult to use in this sense but the G4 is taller and wider at 76x149.9mm.

We were also disappointed by the fact that the frame is still plastic, this time with a slightly chromed effect. It feels cheap compared to rival flagships and we're not keen on the sharp edges around the Micro-USB- and headphone ports.

LG uses a Slim Arc curved shape, which means it's comfortable to hold and supposedly makes it 20 percent more durable than a flat smartphone in face-down drops. This subtle curve applies to the entire phone, not just the back, making it

a little like the G Flex 2. It's certainly not a curved screen phone, but does make the G3 feel distinctly flat.

Display

The firm has stuck with a 5.5in screen size and a Quad HD resolution (1440x2560), so it's the same as the LG G3 and offers a high pixel density of 538ppi. It's not the same panel though, as LG has opted to fit its new IPS Quantum Display. The smartphone maker says that colour reproduction has been improved by 20 percent, brightness by 25 percent and contrast by 50 percent.

Percentages aside, the display is better than the G3 (which was the first Quad HD phone to market), but it's not a huge leap. Colours do, on the whole, look better – especially whites but some look a little over the top. For example, the YouTube icon looks neon red, as though it's eaten too many Haribo.

LG hasn't done itself any favours with the default garish colour scheme, but that can easily be changed. Once again, we think the screen is top quality, so it's the size that's more of an issue here as 5.5in will be too large for some users.

Processor

Which processor LG would opt for was something we had to wait to find out and it's not the Qualcomm Snapdragon 810 (as used in the LG G4) or the firm's own Nuclun processor. Instead, the G4 has a Snapdragon 808, which makes it the first device we've seen with the chip.

It's a six-core processor offering dual-core ARM Cortex A57 and quad-core A53 with 64-bit support. It also has an Adreno 418 GPU, which supports 3D gaming on 4K displays and X10 LTE which has integrated LTE Advanced for download speeds of up to 450Mb/s (theoretically).

It can't keep up with rivals on pure benchmark numbers (see opposite), as you might expect, but that doesn't mean the G4 is slow. It feels nipper than the G3 and can keep up with the Samsung Galaxy S6 some of the time in a side-by-side



comparison but Samsung's handset does feel silkier in operation.

Battery

LG says it has worked with Qualcomm on the 808 touting is as 'snappy yet energy-thrifty'. It claims the change means an extra 20 percent battery life compared to the G3 despite having the same battery capacity. A removable battery is a key feature of the LG G4 when compared to rivals as it's the only flagship with this option.

In terms of battery life, we've not noticed it being dramatically different to the G3, which lasted a couple of days with normal usage. During testing, the G4 lasted between one-and-a-half and two days, so there's not much difference.

In our battery test, the G4 managed four hours 44 minutes with a numerical score of 2841. In comparison, the Samsung Galaxy S6 lasted close to seven hours and produced a score of over 4000.

Our real quibble on the battery front is that LG no longer offers wireless charging as standard, which is not a good move. You'll need to buy the Quick Circle case to gain this feature which seems odd when having a leather cover is one of the main reasons to purchase the G4.

It's also strange that LG G4 doesn't offer Qualcomm's Quick Charge 2.0 despite the Snapdragon 808 supporting this feature. Like the G3, it is supplied with a 1.8A charger, which is still pretty speedy. It's also odd to see no extreme power saving mode, which gives you basic functionality on a black and white interface.

LG has simplified things when it comes to memory and storage, with 3GB of RAM and 32GB of storage-matching rivals. There is, however, the microSD card slot, which many were annoyed to see dropped on the Samsung Galaxy S6, so you can bump things up if you need to.

The G4 has the kind of wireless you'd expect from a top-end phone, with 11ac Wi-Fi, Bluetooth 4.1 LE and NFC. This means that LG hasn't added any of the features you can find elsewhere such as a fingerprint scanner and heart rate monitor. The IR blaster remains from the G3.

Cameras

A major feature that LG has been pushing since before the launch event is the camera which has an aperture of f/1.8. The main camera is 16Mp, up from 13Mp, and has OIS 2.0 (optical image stabilisation). A new feature called Quick Shot means you can double-tap the Rear Key to launch the camera and take a photo. However, while this is fast, it's difficult to frame the shot with the screen off, so you'll probably need to do some cropping.

Not that the G3's camera is bad, but this is the biggest area of upgrade for us. The G4's main camera is up there with the best, taking predominantly great shots in a range of conditions.

The new version of OIS can move up to two degrees, which is double what the G3 has to offer and now has a third z-axis of movement. You can see and feel this in action when you're shooting with the G4 and it's

the best optical image stabilisation we've seen on any smartphone.

We also like the addition of the Manual Mode, which allows you to start controlling the settings yourself - it's fun to try even if you're not into photography. You can tweak the shutter speed, ISO, exposure compensation, white balance and use manual focus.

Selfie fans will appreciate the 8Mp front camera, which has an f/2.0 aperture. It's easy to take photos using the Rear Key as a shutter button, but you can also use the new Gesture Interval Shot option to take a series of four selfies.

Software

The G4 comes pre-loaded with Android 5.1 Lollipop, and the firm's new UX 4.0 interface. This looks similar to the G3's user interface and still has existing features such as Smart Bulletin and Smart Notice, but there are some new features.

Smart Bulletin sits to the left of the homescreen, a now common place for a special feature such as Google Now, Flipboard and BlinkFeed, depending on the device. On the G4, this vertical feed gives you information such as fitness tracking, calendar events, while also giving you control over music playback. If you don't like it, Smart Bulletin can be switched off in the settings menu. Smart Notice is improved and the widget changes colour to match your wallpaper.

There's also an improved Gallery app and a new feature called Event Pocket, which allows you to create a unified calendar by dragging and dropping appointments and activities from multiple calendars and social media sites.

It's also worth noting that the phone comes pre-installed with Google Office and G4 owners will receive an additional 100GB of Google Drive storage free for two years, which is a lot of extra space.


Beyond these additions, what we particularly like is the amount of things you can customise the device. Like previous devices, you don't have to make do with the standard navigation buttons. You can have up to five on the bar, including one to open and close the notification bar, QMemo+, QSlide and Dual Window. You can also manually choose whether to show or hide the navigation bar in apps you have installed rather than letting the smartphone decide.

You can once again choose the interface's font (and size) and turn the notification LED off if you don't want it. There's also the ability to adjust the strength of vibration for haptic feedback and notifications.

New for the G4 is a new section called Smart settings. This means you can automate a lot of things such as switching Wi-Fi and Bluetooth on and off, plus changing your sound profile. You can set these to automatically adjust when you're at home or away from home plus when earphones are plugged in.

Another new option is Smart cleaning, which allows you to clear some space by cleaning some apps and deleting temporary files.

Verdict

LG has gone down an unexpected route with its leather models, which we like. The so-called ceramic models cost less, but feel cheap and plasticky. On the whole, the hardware is strong - particularly the camera - but not massively different from the G3 and has tough competition. We feel build quality could be better with a metal frame and dimensions going down, not the reverse. This is the flagship to go for if you want a removable battery and expandable storage, but it's a shame to see features such as wireless charging dropped. (Remember the G3 is now a steal at under £300 SIM-free).  **Chris Martin**

	GEEKBENCH 3	GFXBENCH T-REX	GFXBENCH MANHATTAN	SUNSPIDER*
LG G4	3513	25fps	9fps	715ms
LG G3	2233	20fps	7fps	959ms
Samsung Galaxy S6	4438	30fps	14fps	462ms
HTC One M9	3778	50fps	24fps	867ms
iPhone 6	2794	49fps	26fps	351ms

* lower is better

£579 inc VAT**Contact**■ htc.com/uk**Specifications**

Android 5.0 Lollipop with Sense 7.0; 5in Full HD (1080x1920) screen; Qualcomm Snapdragon 810 processor; 64-bit, octa-core; 3GB RAM; 32GB storage; microSD card slot (up to 128GB); 100GB Dropbox cloud storage; 20Mp rear camera; 4Mp UltraPixel front camera; dual-band 11ac Wi-Fi; NFC; Bluetooth 4.1 with aptX; Infrared transmitter; GPS; non-removable 2840mAh battery; 70x145x9.7mm; 158g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**SMARTPHONE****HTC One M9**

The One M9 is HTC's flagship smartphone for 2015. The Taiwanese firm hasn't altered the design of the M9 much compared to the M8 or even the original HTC One. It's more a case of design evolution.

It would be easy to criticise HTC for having another similar-looking smartphone, but we can hardly blame it considering how stylish the previous two generations are. Look beneath the surface, though, and some changes have been made.

The One M9 is made from a similar metal block to that of the M8, and has the same curved shape and hairline finish. However, new to HTC's latest handset is a scratch-resistant coating, machine drilled buttons and a sapphire glass lens on the rear camera. The power button is now on the side instead of the top, which we think is a much better place for it. It also has a textured finish, so you can feel the difference next to the smooth volume buttons. It's still easy to get confused between them though, and we think that the volume buttons would be better placed on the left. Motion Gestures mean that the power button isn't needed half as much, though.

Colour options are similar to previous generations, but HTC has employed a new two-tone look, with the back and sides getting contrasting adonisation. Two options are available - Gold on Silver (pictured) and Gunmetal Grey.

The One M9 is comfortable in the hand, and like the M8, is one of the only phones on the market to compete with the iPhone on build quality. It screams of craftsmanship, but the stepped design might not be to everyone's taste as at certain angles it looks like a case.

We were hoping for a thinner and lighter design, and although HTC tells us the device is slightly lighter than its predecessor, we weighed them both at 158g. It's also marginally thicker at 9.7mm, compared to 9.6mm. It's 10.4mm where the camera slightly sticks out.

HTC's original Dot View case was a winner and there's a new version for the M9. It's a similar affair and you can customise what is shown through the tiny holes in the front cover. The big difference is a clear

back, which partly wraps round the side so you can still admire the metal chassis. There's little worse than buying a gorgeous-looking product, then hiding it behind a case.

Hardware

HTC has decided to stick with a 5in screen for the M9 and has also kept the resolution at Full HD (1080x1920). This might seem a letdown when compared to Quad HD devices such as the LG G3, but HTC tells us the higher resolution isn't needed on a display this size and that it would affect the battery life.

Five inches is a solid size that is neither too big, nor too small, but we can't help but feel disappointed that HTC has done nothing here to upgrade. We've seen Quad HD on the LG G3 and now the Samsung Galaxy S6, and it's simply better. The M9's screen looks good but the aforementioned rivals look incredible.

Other specifications that remain unchanged include the 32GB of internal storage (around of which is 21GB available) and a microSD card slot capable of accepting up to 128GB cards. There is a 64GB model, but this has not been confirmed for the UK market.

Wireless setup remains strong, with 11ac dual-band Wi-Fi, Bluetooth 4.0 with aptX, NFC and an IR blaster. The One M9 also supports 4G LTE networks via the nano-SIM slot if you have the right tariff. If you were hoping for any new features such as a fingerprint scanner or heart-rate monitor, then it's bad news. What HTC has done instead is focus on improving existing hardware in the audio and photo departments.

It's not all business as usual, though, and HTC has made a number of improvements to its flagship phone. Memory, for example, has been boosted by 50 percent to 3GB and there's a new processor in the form of



Qualcomm's Snapdragon 810, which is both octa-core and 64-bit (quad-core 1.5GHz Cortex-A53 and quad-core 2GHz Cortex-A57). It comes with the Adreno 430 GPU and we can't fault the performance. It's only the camera app that doesn't open instantly.

This is the first phone with a Snapdragon 810 processor that we've been able to benchmark in the lab, and the results are impressive. It's got the best Geekbench 3 score we've ever seen and matches the iPhone 6 on graphics. The SunSpider web browsing score isn't as good as the M8's, but we don't have any problems in this area from a user's perspective.

The BoomSound front-facing stereo speakers are still a key feature and HTC has added support for High-Res 24-bit audio, which puts this phone on a par with Sony's top-end smartphones and tablets. HTC has also added Dolby Audio. Once again the built-in speakers sound amazing offering the best experience you'll find on a smartphone.

A new audio feature called HTC Connect means a simple three-

finger swipe will send the audio to a connected speaker – a reverse gesture will bring it back. We tested this out with a Harmon/Kardon speaker and it worked first time, although with a slight delay.

With BlackFire technology and some more speakers, you'll also be able to have a multi-room setup playing different tunes in different rooms or the same one on everything. Other M9 users will be able to hook into the system and queue their own tracks.

Cameras

The HTC One M9 no longer has the Duo Camera setup of its predecessors. Instead, HTC has opted for a 20Mp rear camera with the same dual-LED flash. This is the biggest hardware change compared to the M8 and shows HTC has given up on the refocusing element.

We like the stylish and easy-to-use camera app, which has various modes. There's Camera, Selfie and Panorama, but you can add more such as Bokeh and Split Capture. With 20Mp on offer, the M9 offers plenty of detail and we found the camera accurate when autofocus and shooting quickly. It does crop to 16:9 by default though, so you'll need to head into the settings to get all those available pixels.

You can shoot in a regular mode, but quickly switch to others such as HDR, Night and Macro. If you're feeling a little more adventurous, you can enter manual mode and start fiddling with the white balance, ISO, shutter speed and even focus. It's displayed on the screen in bars. The move from UltraPixel to simply more pixels does mean the M9 isn't as good in low-light compared to its predecessor.

On the video side, it can now record video up to 4K resolution and uses a 'dynamic exposure algorithm' to mimic the human eye. Default is Full HD though, and to rival the iPhone there's a Slow motion mode that can record up to 120fps.

HTC hasn't completely given up on the UltraPixel (which lets in more light), as the front camera on the M9 is the rear camera from the M8. Whether or not it was good on the back of the previous generation, it makes for a good selfie camera, with crisp and detailed images. It works well in low light, too.

To go with the new hardware is a software option called One Gallery, which is designed to bring together all your photos from the likes of Dropbox, Flickr, Google Drive and Facebook in one place.

Battery life

HTC increased the battery size from the original HTC One to the One M8, and has done so again with the new One M9. It's now 2840mAh compared to 2600mAh, which is a slightly smaller jump from last time around. It's still non-removable.

Despite the larger capacity, we found the battery life to be no different to the One M8. With an average usage pattern, the M9 lasted for a couple of days before needing to be charged. That's still a good effort, with many phones only managing just one day.

There's no wireless charging, which is a shame. The M9 One does, however, have an Extreme power saving mode, which puts the device into a basic mode, allowing access to a small selection of simple functions like phone and messages.

Software

As you would expect, the One M9 runs on Android 5.0 Lollipop. HTC has, however, added its own user interface over the top. The handset introduces Sense 7.0, which means you get the company's style, including icons and apps, but there are also some new features.

HTC largely does things its own way with BlinkFeed to the left of the main homescreen, a grid view recent apps menu and a vertically scrolling app menu. However, the stock drop-down notification bar is there

and you can customise which quick settings you want.

Customisation is the main emphasis of Sense 7.0, so there's a new Themes app where you can download various user interface themes. However, you can edit details yourself such as icon styles and fonts. The software will also generate a theme for you based on a photo, which is a nice touch.

Motion Launch Gestures are still part of Sense and mean you can do handy things such as double-tap the screen to turn it on and off. Up-, down-, left- and right swipes will unlock, turn on voice dialling, launch the widget panel and open BlinkFeed respectively – all with the screen off.

We've already mentioned HTC Connect and One Gallery in relation to audio and photo, but another new feature is called HTC Sense Home – it's not an app but the launcher that HTC now uses. The software is location aware, so you can use a different lock- and home screens depending on where you are.

For example, when at work you'll get icons for your email and calendar, and these will automatically be replaced with a remote control app and Facebook when you get home. You can select what you want for each layout but suggestions will be made based on your habits. We've only been using it for a few days, but it's already proved itself a handy addition.

Verdict

The HTC One M9 is a desirable smartphone, with the best design and build available in Android land, even with Samsung upping the ante. It's good to see the powerful Snapdragon 810 and more memory, however, some key hardware remains the same meaning M8 users are unlikely to be tempted to upgrade – and the old model is now an attractive buy at around £350. The fact the Galaxy S6 costs the same, yet has more impressive specs is bad news for HTC.  **Chris Martin**

	GEEKBENCH 3	GFXBENCH T-REX	GFXBENCH MANHATTAN	SUNSPIDER*
HTC One M9	3778	50fps	24fps	867ms
HTC One M8	2761	30fps	12fps	583ms
iPhone 6	2794	49fps	26fps	351ms
Samsung Galaxy S6	4438	30fps	14fps	462ms

* lower is better

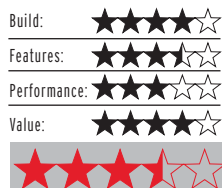
£500 inc VAT

Contact

■ huawei.com/en

Specifications

Android 5.0 Lollipop
5.2in ((1920x1080, 424ppi)
IPS Full HD screen;
Hisilicon Kirin 2GHz 930
octa-core processor;
3GB RAM; 16/64GB
storage; microSD card
slot; Bluetooth 4.1;
Wi-Fi 803.11b/g/n; 13Mp
rear camera; 8Mp
front camera;
2680mAh battery;
144.9x72.1x6.4mm; 144g



SMARTPHONE

Huawei P8

We've been impressed by Huawei's previous flagship phones, namely the Ascend P6 and P7, with the former earning a Recommended Award. So we've been looking forward to trying out the P8.

Huawei likes doing things wafer-thin, and although the P7 was thicker than the P6, it's now thinner again at just 6.5mm. While a svelte phone looks great and seems better on a spec sheet, we've found some to be too thin becoming less ergonomic to hold. The P8 is extremely thin, but luckily not so much that it's uncomfortable.

We like the mostly metal body and the bevelled edges make it more ergonomic in the hand. It's a shame that the back has a few lines of legal information at the bottom, while the front looks strangely plain without an embossed logo.

The slender frame means that it's also very lightweight and a 78.3 percent screen-to-body ratio is impressive. As with other Huawei handsets, the P8 has similarities in appearance to the iPhone 6 and Samsung Galaxy S6 with its metal frame, although it's more symmetrical than before and there's no rounded bottom edge. The square shape makes it look similar to the Sony Xperia Z3, so it's got a little bit of all three in appearance.

The P8 is bigger than its predecessors, and although it's almost the same height and width as the Galaxy S6, it gives the impression of being larger because of the squarer corners.

It's available in four colours: Carbon Black, Titanium Grey, Mystic Champagne and Prestige Gold. These are split into standard and premium models, so the 64GB option is available only in black or gold, while the 16GB option is only grey or champagne. It's not fully waterproof, but according to Huawei is spill resistant thanks to a nano-coating.

In an interesting move, the Chinese company is offering an E-ink cover that sits on top of the P8 to turn it into a traditional eReader.

Hardware and specifications

Following on from the previous generations, Huawei has once again increased the screen size for the P8. It's now 5.2in compared to 5in and matches the Sony Xperia Z3. It's still an IPS screen and the 1920x1080 resolution remains at Full HD 1080p, creating a pixel density of 424ppi. The screen is decent, with good colour reproduction and viewing angles, although unusable at the lower end of the brightness slider.

Huawei has installed a Kirin 935 octa-core processor clocked at 1.5- and 2GHz. There's also 3GB of RAM and either 16- or 64GB of storage, which matches top-end Android phones. Huawei has kept the microSD card slot, so you can add up to 128GB more storage.

Note that this uses the phone's second SIM slot, so you won't be able to use two SIMs if you need extra capacity.



Performance

While the phone is smooth in general use, there are times when it lags and shouldn't. For example, tapping an email to open it and scrolling within the Play store is jerky. Huawei says its 100 percent better than the P7 in GPU and 80 percent on CPU, but our benchmark results (see opposite) aren't the most glowing - particularly on the graphics side of things, which is why we suspect there is a perceivable lag to the interface at times.

Battery performance should be one-and-a-half days with normal usage, which isn't overly impressive, but the battery is only 2600mAh as the phone is so thin. During testing we found that the P8 lasted only a day on a full charge, which is disappointing. In our battery test, the P8 lasted five hours 30 minutes with a score of 3296. This isn't awful but isn't impressive either, with the Samsung Galaxy S6 managing six hours and 53



We like the amount of customisation on offer, which includes themes and the ability to even change home screen transition animations

minutes and 4136 points. We've also found it lost almost all its power from fully charged overnight. Hopefully this is just a problem with our review sample and that other phones last longer.

Camera

There's a 13Mp camera on the rear and 8Mp snapper on the front. According to Huawei, the P8 captures better results in low light conditions, and offers best in class optical image stabilisation and DSLR-level independent image signal processor.

The cameras are by far the best features of the Huawei P8 with excellent results all-round: close-ups, landscape and low light. The phone has an iOS-style camera app that is easy enough to use, though you'll have to head into the settings to use the full resolution of the main camera, which by default shoots at 10Mp and 16:9. It also records video at 720p, despite being capable of Full HD - a lack of 4K recording is why you might want to opt for a more expensive rival.

We don't like the almost pointless Beauty mode, which simply softens the image so you don't look like the same person any more, but the Time-lapse and Light painting modes offer a bit of fun when the right situation arrives. All Focus allows you to refocus a shot after it's been taken, though during testing we found that it didn't work as well as other phones with this option. What's a little confusing is being able to switch between a few modes with a simple swipe, while others, including the arguably more useful HDR, are tucked away in the menu.

Software

As you'd expect from a new 2015 smartphone, the P8 comes with Android 5.0 Lollipop pre-loaded. Huawei is sticking with its own Emotion UI, which is placed over the top. It's similar to previous versions, which is both good and bad.

On the plus side, we like the amount of customisation on offer, which includes themes and the ability to even change home screen transition animations. There's also a decent lock screen that changes the photo each time you press the power key, and offers some settings and shortcuts when swiping up from the bottom. However, the lack of an app menu is strange and unnecessary, and means all your app icons must sit on home screen panels like the iPhone.

As with the P7, the Phone Manager app can be incredibly useful once you get to know it, offering you advice on which power and memory-hungry apps to shut down. You can also control notifications, clean storage and enable things such as a harassment filter. The drop-down notification bar works well to an extent and we like the way it takes you to quick settings when there are no notifications to display. However, it doesn't group notifications properly so, for example, it will let you know you have X amount of emails, then proceed to show you each one rather than giving you the option to expand that initial notification.

There are a number of background features that you're not supposed to notice such as Signal+ and Wi-Fi+, which automatically try to give you the best experience by

switching between antennas and Wi-Fi. There's also a smart international dialler, so you don't need to input the country's code.

A strange feature called Knuckle Sense allows you to double-tap the screen to take a screenshot, which you can then edit. You can also draw around the section of the screen you want to capture if you don't want the whole thing. This is handy at times, but the phone activates this strange drawing mode at random times while you're using the phone normally. We've tried to turn this feature off, but can't find a setting for it anywhere. It would be fine if you could just choose not to use it, but the screen often thinks you're using a knuckle when you're not. This affects the entire experience of using the P8 as you never know when it's going to get in the way of what you're doing.

Verdict

The Huawei P8 has an excellent design and build for a price lower than other flagship rivals. On the whole hardware is decent too, particularly in the photography department. However, poor performance and buggy software taint the experience to a frustrating level, which makes it difficult to recommend.  **Chris Martin**



	GEEKBENCH 3	GFXBENCH T-REX	GFXBENCH MANHATTAN	SUNSPIDER*
Huawei P8	3405	15fps	10fps	964ms
Huawei P7	1870	12fps	N/A	1296ms
Samsung Galaxy S6	4438	30fps	14fps	462ms
HTC One M9	3778	50fps	24fps	867ms
iPhone 6	2794	49fps	26fps	351ms

* lower is better

£129 inc VAT

Contact

■ microsoft.com/en-gb

Specifications

Windows Phone 8.1 with Lumia Denim; available in blue, orange, black or white; 5in HD (1280x720, 294ppi) ClearBlack IPS display, Gorilla Glass 3; quad-core 1.2GHz Qualcomm Snapdragon 400; Adreno 305 graphics; 1GB RAM; 8GB storage (plus up to 128GB via microSD and 30GB free OneDrive storage); 4G LTE (Micro SIM); Bluetooth 4.0; 802.11b/g/n Wi-Fi; Wi-Fi Hotspot; NFC; DLNA; A-GPS; A-GLONASS; 8Mp rear camera with f/2.2 aperture; 0.9Mp front camera with f/2.4 aperture, HD 720p video; 2500mAh removable battery; 72.2x8.8x141.3mm; 145g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



SMARTPHONE

Microsoft Lumia 640

Microsoft does budget phones incredibly well, and with almost an identical spec this Lumia 640 is a strong rival to the £149 Moto G if you're prepared to go down the Windows Phone- rather than Android route. Successor to the Lumia 630, the 640 adds some useful improvements, yet it comes in at the same £129 price SIM-free.

And why wouldn't you go down the Windows Phone route? A criticism of Windows Phone has long been its lack of apps. This is a situation that is improving all the time - indeed, as we'll discuss later in this review we were pleased to see one of our go-to benchmarks, GFXBench, is finally available in the Windows Store - and there are workarounds for accessing Google services on Windows Phone for which there are no apps.

We like Microsoft's mobile operating system. Windows Phone is bright, it's colourful, and it's something different to the icon-led home screens of iOS and Android, with tiles that update with information in real-time. Once you've become familiar with its layout, it's easy to use.

Microsoft adds several of its own apps, and a key selling point of the Lumia 640 is its year's free Office 365 subscription (worth £60), which can also be enjoyed on two other devices. One of the perks of Office 365 is 1TB of free OneDrive storage, which is handy since only 8GB comes on the Lumia 640, although there is also a microSD card slot that can accept up to 128GB.

Compare it to the Lumia 630 and this Lumia 640 is quite an upgrade. The phones share the same 1.2GHz quad-core Snapdragon 400 chip, so performance remains distinctly mid-range, but the 640 has had a slight boost with the doubling up on RAM to 1GB. The camera loads much faster under Lumia Denim and, although it's still reasonably basic, it now features an 8- rather than 5Mp lens and adds an LED flash, while video recording is possible at 1080p rather than 720p. Microsoft has also added a selfie camera to the front of the Lumia 640, which lets you take advantage of Skype. The screen is improved too, both in size and resolution, and Microsoft has upped

the still-removable battery capacity from 1830- to 2500mAh.

Whereas previously you needed to pay an extra £20 for the Lumia 635 if you wanted 4G LTE connectivity, the Lumia 640 LTE can handle it out of the box. As before two versions of this phone are available: the Lumia 640 reviewed here, and the Lumia 640 XL. The XL is in essence the same phone, but with a larger 5.7in display and improved cameras (13Mp at the back and 5Mp at the front). It costs an extra £90, though, at £219 SIM-free.

Design and build

The design is very similar to that of the Lumia 630 and 635, a little larger and heavier yet slightly thinner, with the same matt-finish case in black, or glossy in blue, orange or white, that sits comfortably and securely in the hand. This case is removable, but wraps around to the front, resulting in a solid feel that won't creak or flex under pressure.

It's simple and unassuming, a slab of plastic with a slightly curved rear and rounded edges. There's a gaping hole on the rear for the small speaker, and the rear camera and headphone jack protrude just enough to spoil the Lumia 640's smooth surface, but still it's a good- if basic-looking phone for the money.

As before, the screen is covered by tough Gorilla Glass 3, with cutouts top and bottom for the earpiece and microphone. It's a larger sheet of glass, though, since Microsoft has upgraded the Lumia's display not only in size but also resolution. Whereas the Lumia 630 and 635 feature a 4.5in 854x480 ClearBlack IPS panel, the 640 has a 5in HD (1280x720) screen, which results in an improved pixel density of 294ppi.

As such, browsing the web, watching videos and even playing



the odd game is now a far more enjoyable experience on the Lumia 640. The screen is not without fault - some backlight bleed issues are still visible - but it's a vast improvement and noticeably sharper than that of the 630.

At the top of the screen is something entirely new: a selfie camera. And it's not the only change Microsoft has made in the photography department: around the back is an LED flash and, although the difference isn't visible, an upgraded 8Mp camera. There's still no dedicated camera button, though, and around the sides you'll find only a volume rocker and power button, headphone jack and a Micro-USB charging port.

Hardware and performance

Microsoft hasn't particularly focused on performance in its upgrading of the Lumia 640. And that's fine, since the 1.2GHz Qualcomm Snapdragon 400 quad-core processor is nothing spectacular but capable enough for day-to-day use, especially at this price. Microsoft has, however, doubled the RAM to 1GB, which brings the Lumia 640's spec into line with the latest Moto G.

Windows Phone doesn't support

Geekbench, the benchmark we use to test phone processing performance, but the new Moto G recorded 345 points in the single-core component and 1182 multi-core. The difference in software will come into play here, so you can't assume the Lumia 640 would score the same results were testing possible, but in real-world use we found the Lumia 640 quick enough. Swiping between screens and launching apps still takes a second or two, but it's not so slow as to cause you pain. And the camera, in particular, now loads significantly faster – a couple of seconds rather than the six- or seven of the Lumia 630.

Happily, our second go-to benchmark, GFXBench, is now available in the Windows Store. Both Lumia 640 and Moto G use the Adreno 305 GPU and the aforementioned 1GB of RAM and Snapdragon 400 chip, but we found slightly slower results from the Lumia 640 in T-Rex – 7.5fps against the Moto G's 11fps.

SunSpider performance has seen a boost with the Lumia 640. While we recorded 1486ms for the Lumia 630 and 1968ms for the Moto G, the Lumia 640 recorded an impressive 1201ms. However, it's worth noting that we typically run SunSpider in Google Chrome to ensure a fair test. Chrome isn't available for Windows Phone, so our Lumia results were taken in Internet Explorer 11.

Battery life was a concern with the Lumia 630. Microsoft has seen fit to increase the capacity of the still-removable battery from 1830- to 2500mAh, which means this phone will capably get you through a full day's use.

In terms of storage there's still only 8GB built in, of which less than half is available, but you do get up to 128GB of expandable storage via support for microSD. Take up Microsoft's offer of a free one-year Office 365 subscription and you get 1TB of OneDrive storage (and 30GB if you don't).

Connectivity

The connectivity specs come as no surprise at this price. There's no support for the latest 802.11ac Wi-Fi, but Microsoft does include Wi-Fi hotspot, Bluetooth 4.0, DLNA and NFC. The GPS and GLONASS is assisted. One of our favourite upgrades over the

Lumia 630, though, is the 4G LTE connectivity. (There is apparently also a 3G model, but the only version we've seen on sale in the UK is 4G – check before you buy.)

Cameras

The Lumia 640 is not the best cameraphone in the world, but it's significantly better than the Lumia 630 in this regard. Microsoft has added an LED flash, which means there's an improvement in low-light photography, plus it's upgraded the sensor from 5- to 8Mp, which makes for sharper shots.

Something completely new for the Lumia 640 is a front-facing camera. It's a meagre snapper at 0.9Mp, but the Lumia Selfie app makes it a little more bearable. Perhaps more important than selfies is the fact it's now possible to use Skype for video calling.

Software

The Microsoft Lumia 640 runs Windows Phone 8.1 with Lumia Denim, although Windows 10 will be available later this summer.


Windows Phone is heavily criticised for its lack of apps, but the situation is improving. As we mentioned earlier, we were pleased to find the GFXBench benchmark is now available for Windows Phone, plus if it's the lack of Google apps that is bothering you then it is possible to view Google services online and to sync some services with Windows apps. Also see: How to

sync Google services with Windows Phone 8 – keep using Gmail, YouTube, Maps and more.

In other respects Windows Phone is every bit as good as iOS and Android, although it has a different look and feel with a colourful tiled interface in place of the familiar icon-led home screens. In place of Siri and Google Now there's the excellent Cortana, and with Action Centre notifications are just as easy to manage.

Here Drive+ and Here Maps are very good, offering free turn-by-turn driving instructions, offline maps and live traffic information, while MixRadio offers free audio from your favourite artists (without ads, although you can skip the track only six times in an hour). Add to that Kids' Corner, preinstalled social apps and a double-tap to wake feature, and Windows Phone isn't looking too shabby next to its rivals.

Verdict

The Microsoft Lumia 640 is a worthy upgrade over the Lumia 630, and this Windows Phone now presents very good value for money. This is the Moto G of the Windows world, with a near-identical spec and a £20 lower price tag. Which phone you choose will come down to your software preferences – many users will be happy with Windows Phone, but if third-party apps feature heavily on your wishlist you may find that extra £20 for the Moto G money well spent.  **Marie Brewis**



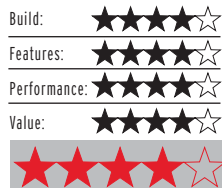
£230 inc VAT

Contact

■ sony.co.uk

Specifications

5in IPS screen (720x1280, 294ppi); Android 5.0 Lollipop; Qualcomm Snapdragon 615 octa-core processor, 64-bit; 2GB RAM; 8GB internal storage, microSD card slot (up to 128GB); 13Mp rear camera with Exmor RS; 5Mp wide angle front camera; Bluetooth 4.1; NFC; IP65/68 waterproof; 145.5x72.6x7.3mm; 136g



SMARTPHONE

Sony Xperia M4 Aqua

The M4 Aqua doesn't look or feel like a mid-range smartphone. Indeed, you could easily confuse it with Sony's flagship Xperia Z3 since it has the same styling and design traits. You do notice the plastic edging (rather than metal) when holding it and the glass rear cover doesn't sit entirely flush with the edge at the top and bottom. Neither are big issues, though, and the phone pulls off the premium look at half the price extremely well.

With the M2 Aqua, Sony brought the dust- and waterproofing that was previously reserved for the high-end Z range to a cheaper smartphone. The M4 also has this feature and comes with an IP68 rating, which is the highest available.

We like the size of this phone and it's comfortable to use in the hand. It's also very thin and light for a mid-range phone at 7.3mm and 136g.

This is Sony's first smartphone to come with a Qualcomm Snapdragon 615 octa-core (quad-core 1.5GHz Cortex-A53 and quad-core 1GHz Cortex-A53) 64-bit processor and there's also 2GB of RAM, 8GB of internal storage and a microSD card slot (up to 128GB).

Performance is good for a phone of the this price. As you can see from our benchmark scores (below), the Xperia M4 Aqua outpaces the pricier Samsung Galaxy A5 in three out of four benchmark tests, and beats the Huawei Honor 6 in the graphics departments with its lower resolution display. None of the results are particularly impressive, but we didn't have any issues with its performance during testing.

The screen is a 5in IPS display with a 720p HD resolution. It's a decent offering for a mid-range smartphone, with a pixel density of 294ppi. There's good colour reproduction, brightness and viewing angles.

There aren't any other features to mention such as wireless charging



or a fingerprint scanner. Instead Sony has focused on photography, battery life and the waterproof design. There is NFC, Wi-Fi and Bluetooth 4.1 on-board, though.

The battery is hidden away under the shiny exterior and you can't access it. According to Sony, this should last for two days. Although there's no wireless charging, keeping the M4 Aqua topped up is easier thanks to a waterproof USB port.

Cameras

Mid-range smartphones tend to scrimp on photography, but the M4 Aqua has a 13Mp rear-facing camera with Sony's Exmor RS sensor and a 5Mp wide-angle lens snapper at the front for selfies. Sony is one of the few smartphone makers to still offer a dedicated physical button for the camera. You don't get 13Mp as standard because the phone is set to shoot in 16:9 to match the screen - you'll get 9Mp unless you switch to 4:3.

The M4 Aqua runs Android 5.0 Lollipop, which is the latest version, with Sony's own user interface. This uses many stock Android elements such as the recent apps menu and drop-down notification

bar. For the better, Sony has kept it's little floating widgets, including a calculator that is accessible via recent apps. You can also select which Quick Settings you want, which is not a part of stock Lollipop.

During testing, we found the software to be smooth and we like the fact that Sony hasn't gone mad with customisations. This means there's little to talk about beyond the usual selection of nice wallpapers and widgets, although you can download Themes that change the look and feel of the interface if you want.

As per usual, Sony preloads its own apps such as Walkman and PlayStation, but you'll have to opt for a Z2 or Z3 handset if you want features such as High-Res audio support. Things are a little more basic on the M4 Aqua. There are a number of preloaded apps, including Vine, AVG, OfficeSuite, Sketch, TV SideView.

Verdict

The Sony Xperia M4 Aqua is a solid mid-range smartphone. It offers flagship-like design, a great camera and a user-friendly Android Lollipop. **Chris Martin**

	GEEKBENCH 3	GFXBENCH T-REX	GFXBENCH MANHATTAN	SUNSPIDER*
Sony Xperia M4 Aqua	2344	25fps	12fps	1294ms
Samsung Galaxy A5	1476	9fps	4fps	735ms
Honor 6	3103	17fps	9fps	828ms

* lower is better

£299 inc VAT**Contact**■ huawei.com**Specifications**

Android 4.4.2 KitKat OS;
5.5in (1080x1920, 401ppi)
IPS LCD display; Kirin
1.8GHz Octa-core 925
processor; ARM Mali-T624;
3GB RAM; 32GB internal
storage, up to 128GB
microSD; dual 8Mp rear
camera and dual-LED
flash; 8Mp front camera;
video recording at up to
1080p; Wi-Fi 802.11a/b/g/n;
Bluetooth 4.0; LE; NFC;
infrared; A-GPS; 4G; LTE;
Micro- or Nano-SIM (dual
SIM OR one SIM and one
microSD card); non-
removable Li-Po
3600mAh battery
150.5x75.7x7.5mm; 165g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**SMARTPHONE****Honor 6 Plus**

The Honor 6 scored highly in our review late last year, and after a positive reception, Honor (a Huawei-owned brand) has decided to expand the range to cater for those who like bigger, phablet-style smartphones.

The Honor 6 Plus is bigger than its Honor 6 sibling, with a 5.5in screen rather than the 5in screen. Aside from the size, though, the 6 Plus looks a lot like its smaller counterpart, with a metal band around the edge (which is real metal this time – an improvement over the Honor 6's plastic frame), a glass back, and the same 7.5mm thin body. It weighs only 165g, too, so feels comfortable to hold and use, if a little slippery. We think it looks great overall, and would definitely fool you into expecting a much higher price tag.

The only small niggle we had with the design is that we kept picking it up and attempting to use it from the wrong side. Both sides of this smartphone feel identical thanks to that glass back, so you'll often find yourself tapping on the rear of the device for a second until you look at what you're doing.

The display is Full HD 1080x1920, giving it a pixel density of 401ppi, which is good for a mid-range smartphone and matches the iPhone 6 Plus's Retina display. It's brilliantly bright and crisp, so for anyone looking for a large smartphone that they can watch videos and movies on this is a worthy contender. We also like the fact that the image looks as though it's laying directly on the surface. This is something that the iPhone 6 Plus doesn't manage, so we'd go as far as to say that the screen on the Honor 6 Plus looks better than its Apple rival.

Inside the Honor 6 Plus is a Kirin octa-core 925 processor clocked at 1.8GHz and paired with

3GB RAM, and has proved to be a fairly fast smartphone. We carried out benchmark tests to determine the processor speed (Geekbench), graphics speed (GFXbench) and browser speed (SunSpider).

As you can see from the table below, the Honor 6 Plus manages to beat some flagship smartphones in the Geekbench tests, including the iPhone 6 Plus. It's highly impressive for the price.

Graphics performance and SunSpider results aren't as good, but still manage to stay on par with rivals that have higher price tags.

There's 32GB of internal storage and support for microSD cards up to 128GB in size. Connectivity includes 4G LTE, Bluetooth 4.0, dual SIM (though you'll have to pick between that and the additional storage from microSD as it's a combined slot), GPS and NFC.

The battery is non-removable, but is a good 3600mAh so should perform brilliantly, plus there's a battery saving mode that'll increase that. During testing, we found that the battery managed a good two days on one charge. Additionally, it can also charge other devices thanks to reverse charging.

Cameras

We were particularly impressed by the Honor 6 Plus's cameras. On the front is an 8Mp camera, while on the rear are two 8Mp cameras that allow you to capture wide aperture images and change the focus later. It's similar to the focusing feature found in HTC's One M8, and worked exceptionally well during our testing with an adjustable aperture of f/0.95 to f/16. There's a dual-LED flash, too, and video capabilities reach 1080p FHD.

The Honor 6 Plus is running Android 4.4 KitKat with Emotion UI, but it's possible that a Lollipop



update will arrive in the future. There aren't any particularly outstanding software features, but it's not completely vanilla. There's no app drawer, for example, so you'll have to rely on folders like you do in iOS which will appeal to some but not everyone. The Emotion UI's graphic design also divides opinion, and is sometimes described as childish, but we enjoyed the ability to change the theme of the design, and there are many additional free themes to choose from.

In a nice extra touch, the image see on the lock screen will change every time you wake it from sleep, which we found we really enjoyed.

Verdict

For anyone looking for a smartphone with a large screen, the Honor 6 Plus is worth considering. It has great specs, a good-looking and sleek design and a decent camera, all at a surprisingly low price.

✉ **Ashleigh Allsopp**

	GEEKBENCH 3	GFXBENCH T-REX	GFXBENCH MANHATTAN	SUNSPIDER*
Honor 6 Plus	3264	17fps	9fps	1194ms
Honor 6	2917	41fps	19fps	369ms
Google Nexus 5	2800	24fps	9fps	801ms
Samsung Galaxy Note 4	3272	27fps	11fps	1367ms

* lower is better

£203 inc VAT

Contact

■ zte.com/cn

Specifications

Android Lollipop 5.0 with MiFavor 3.0 UI; 5.5in (1280x720, 267ppi) IPS display; 1.5GHz Qualcomm Snapdragon 615 64-bit octa-core processor; Adreno 405 graphics; 2GB RAM; 16GB storage (plus microSD up to 32GB); dual-SIM dual-standby (one Nano, one Micro); GSM 850/900/1800/1900MHz, WCDMA 900/2100MHz, FDD-LTE 800/900/1800/2600MHz; dual-band 802.11b/g/n Wi-Fi; Bluetooth 4.0; GPS; IR blaster; 13Mp Sony Exmor IMX214 rear camera, 1080p video; 5Mp front camera; FM radio; 3000mAh battery; 156.6x77x7.5mm; 150g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



SMARTPHONE

ZTE Blade S6 Plus

If the ZTE Blade S6 looks a bit like an iPhone 6, the Plus looks a bit like, well, an iPhone 6 Plus. It's a plastic smartphone, but its clean white front, circular home button, rounded corners and curved screen edges do look a bit Apple-esque. It's stylish for the price, just £203 from GearBest's EU warehouse with free shipping.

The 5.5in screen is an HD IPS panel. Not only does it offer a larger screen area than the 5in Blade S6, but it supports a Family Mode that is in essence an easy mode, enlarging the type font and putting only the essentials on a tile-based home screen not too far removed from the appearance of Windows Phone. You won't find this on the Blade S6.

The larger screen makes for a slightly lower pixel density - 267ppi against the standard S6's 294ppi - but it's bright and clear, and adequate for watching films and playing games.

A few cosmetic differences include the loss of a speaker grill at the top (here it's just a slit), central positioning of the bottom-mounted charging port, a dual- rather than single-LED flash and the addition of an IR blaster. Other connectivity specs are the same, with 4G, dual-band Wi-Fi, Bluetooth 4.0 and GPS.

One useful new feature is the ability to turn off the home button LED that glows blue when the phone is on charge or the battery is low.

There are other differences between little and large, too. None of the gestures we admired in the Blade S6 are supported by this Lollipop phablet, and performance is a tad slower, despite the same hardware inside, but still acceptable for a mid-range phone. The battery is larger at 3000mAh against 2600mAh, yet battery performance still isn't ZTE's strong suit.

Rather than side-accessed trays for the dual-SIM- and microSD slots the rear cover is removable, although the battery hidden below is not. In common with the mini Blade the Plus is a dual-SIM dual-standby phone, although here you'll find one Micro and one Nano, rather than two Nano.

Design and build

Hands up, I'm not particularly keen on phablets. And that would be



small girl hands up - phones are just getting way too big these days. With its 5.5in screen and 156.6x77mm chassis the Blade S6 Plus isn't a phone I could comfortably use in one hand without fear of dropping it. The left- and right screen bezels are reasonably slim; it's the top and bottom bezels that make this phone feel huge - more so than the Kingzone Z1, which is actually only a few millimetres smaller.

Admirably, though, in common with the smaller Blade it's just 7.5mm thick (thinner than the Samsung Galaxy Note 4, for example); it's also pretty light for a phablet at 150g. That certainly makes it easier to manage.

Despite my reservations about large phones, they do have clear benefits. The rear-facing speaker is no longer in a position to fire sound into your palm, for example, and the larger screen is useful for playing games and watching video. Those who have eyesight problems will also enjoy the benefits of larger fonts, icons and buttons, especially when used with the aforementioned Family Mode.

It's a nice screen, too. The resolution is only HD (we'd rather see full-HD on a phablet), but it's a good-quality IPS panel with nice colours and good viewing angles. The pixel density is much lower than that of phones such as the iPhone 6 Plus (401ppi) and Note 4 (515ppi), but at 267ppi it's not fuzzy either. (There's also a massive difference in

price, of course, and you could buy three of these for one of those.)

For a mid-range Android the ZTE Blade S6 Plus is nicely designed. The screen has a slippery but silky smooth feel to it when swiping, and its rounded screen edges are so well done that you realise the rear cover comes off only when you can't find the SIM tray.

The white front is very clean, and the buttons below it glow a cool blue. Usefully, you can now turn off these blue LEDs when the phone is charging or the battery is running low, which can be irritating at night. The silver plastic rear is more standard mid-range fare, but the way it wraps around to the front prevents it feeling flimsy or creaking in use.

Hardware and performance

Performance is decent, if not mind-blowing. Given the identical hardware inside - a 1.5GHz Qualcomm Snapdragon 615 64-bit octa-core processor, Adreno 405 graphics and 2GB RAM - you might be surprised to find slightly lower performance than what you get with the £50 cheaper Blade S6.

In our benchmarks we measured 663 points in the single-core and 2095 points in the multi-core component of Geekbench 3.0. By comparison the standard S6 recorded 658 and 2420 respectively.

It was also faster in SunSpider, with 1088ms against this Plus' 1309ms (lower is better in this test).

That's in Chrome, however, which we use to ensure a fair test across phones; using the preinstalled browser the Plus scored 1117ms.

GFxBench graphics results showed less difference. The standard S6 saw an extra frame per second in T-Rex with 25fps against the Plus' 24fps. In Manhattan both phones scored 11fps.

We've recently begun using Geekbench 3.0 to also measure battery life, but for now we have few results to compare, and we have not run this test on the standard S6. However, even with its larger 3000mAh battery (the S6 has 2400mAh), the S6 Plus didn't score particularly well. We recorded three hours 58 minutes, with a battery score of 1587 points. There's no power-saving mode on this phone to extend that life; neither does it support quick charging.

In terms of storage you get 16GB, plus a microSD slot that supports up to 32GB. After installing our benchmarking apps only 7.83GB was available, but you can uninstall some of the preinstalled apps. And this is Android, so you have all manner of cloud storage services available to you.

Connectivity

Connectivity wise there's 4G LTE on one of the two SIMs, plus dual-band 802.11n Wi-Fi, Bluetooth 4.0, GPS, USB OTG support and an IR blaster. Like the S6 you also get AliveShare, which lets you share games, content and more with handsets that also support AliveShare. NFC is not supported. This phone is dual-SIM as standard, accepting one Nano and one Micro.

Check your mobile network is compatible before you buy the ZTE Blade S6 Plus, as we understand customers in North America will have issues. The Blade operates on GSM 850/900/1800/1900MHz, WCDMA 900/2100MHz and FDD-LTE 800/900/1800/2600MHz.

Cameras

When we tested the ZTE Blade S6, we noted that the 13Mp Sony camera with 28mm lens and f2.0 aperture produced realistic colours and sharp detail, but that the LED flash did little to help photography in low light. ZTE has rectified this with the Blade S6 Plus, adding a second LED flash to the camera. In other

respects it's the same, which means 1080p video remains a bit jerky.

The Camera has a Simple mode that makes taking decent pictures easy even if you don't know what you're doing. You can also select from a range of modes such as HDR, Panorama, Smile, Beauty, and add filters in real time. Having taken a photo swiping in from the right opens the Gallery, and you can choose to edit photos either in Google's standard app or the preinstalled PhotoEditor, which offers options to add effects, borders, decoration and annotations, and crop, straighten or otherwise adjust your image.

The 5Mp selfie camera has Beauty and Smile modes, but you can't adjust the effect. Whereas we used Camera360 to edit selfies on the standard S6, this app isn't installed on the Plus. If you want it, though, it's a free download from Google Play.

Software

The Blade S6 Plus comes with Android Lollipop 5.0 out of the box, and ZTE installs the MiFavor 3.0 UI. The biggest difference between standard Android and MiFavor is that the latter removes the Apps menu, displaying every app on the home screen, in the same way that Apple does with iOS. We don't like this approach - it's just too messy, and half these apps we will never use and therefore don't need to see, but you can easily hide away unwanted items in folders by dragging one app on top of another.

All the usual Google apps are preinstalled, as are many of ZTE's own, which means in some cases you have two apps for one function, such as editing pictures. We don't really mind that, although it is a waste of storage space if you have no intention of using them. Some of the third-party stuff can be deleted including WPS Office and Clean Master, but not the core stuff.

Some of ZTE's software is useful, though. Mi-Pop, which we also saw in the standard S6, is much more useful here, placing onscreen a back button that you can position anywhere you like, making one-handed operation with the large screen easier. Hold and drag it to also see

buttons for home, the multitasking menu and more options, or long-press it and you also get options to turn on and off the sound, turn off or reboot the phone, lock the screen or take a screenshot of a specific part of the screen.

The Family Mode we mentioned earlier will be useful for beginners or those with poor eyesight, enlarging fonts and turning the home screen into a tiled interface much like Windows Phone that shows only the items you need (you can add extras if you like).

But while the Plus has this useful Family Mode, it's lost the gestures supported by the Blade S6. And that's a shame. The ability to turn on the flashlight with a shake or launch the mirror app by lifting the phone and pressing the volume up button are among those we missed.

Verdict

The ZTE Blade S6 Plus is a nice phablet for £200, but it doesn't offer enough to make it worth an extra £50 on top of the standard model, which already has a large 5in screen. In comparison to that phone it's lost some of the features we liked, and despite having a larger battery runtime still isn't great. If you're looking for a 5.5in phablet at £200, our money would be on the Kingzone Z1.  **Marie Brewis**



£93 inc VAT

Contact

umidigi.com

Specifications

Android 4.4 KitKat with UMI RootJoy support; 5in (1280x720, 294ppi) dual-glass IPS screen with Corning Gorilla Glass; 1.5GHz MediaTek MTK6732 (ARM Cortex A7) 64-bit quad-core processor; ARM Mali-T760 MP2 500MHz GPU; 2GB RAM; 16GB storage; microSD support up to 64GB; Dual-SIM dual-standby; GSM 850/900/1800/1900MHz, WCDMA 900/1900/2100MHz, FDD 800/1800/2600MHz; 3.2Mp front- and 13Mp rear cameras, dual-LED flash, HD video recording; 802.11b/g/n Wi-Fi; Bluetooth 4.0; GPS, A-GPS; OTG support; 2250mAh removable battery; 144x71.6x7.9mm; 159g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



SMARTPHONE

UMI Hammer

With the Hammer, UMI blends an aviation-grade aluminium alloy frame and a tough polycarbonate shell with a 5in dual-glass IPS and Gorilla Glass HD display to create a virtually unbreakable device that still manages to be both good looking and lightweight. You might not intend to hammer nails with this smartphone, but you could.

But there's more to the UMI Hammer than its tough design. In our benchmarks, the 1.5GHz MediaTek quad-core processor, 2GB of RAM and ARM Mali-T760 GPU powered the UMI Hammer to some decent mid-range results, with an AnTuTu score of 32,506 putting it in the same class as the Google Nexus 5, LG G3 and HTC One. Not bad for a phone that costs just £93 from Geekbuying (remember to add in import duty).

Add to that its 4G connectivity, a 13Mp rear camera with dual-LED flash, built-in dual-SIM and microSD support, and a removable battery, and the UMI Hammer is a great deal.

What's really interesting about the Hammer, though, is its software. Out of the box the UMI runs Android 4.4 KitKat, and has a slew of both useful and customisable smart gestures. With support for Rootjoy, though, things get a lot more interesting. Rootjoy is an application that you download to your Windows PC or laptop, then plug in your phone to quickly install updates, flash a new ROM of your choice (including Lollipop and MIUI6), install a custom UI or back up your data.

With the UMI Hammer, you get all the connectivity options you'd expect, including OTG support, 802.11n Wi-Fi and Bluetooth 4.0. With a separate GPS receiver installed efficiency is said to be improved by 35 percent, getting around the signal problems often experienced by metal-chassis phones.

Design and build

As the name suggests, UMI's Hammer is seriously tough, and yet it's much better looking than most rugged phones you can buy. UMI has taken a super-strong aviation-grade metal chassis and fixed to it an also-tough polycarbonate shell and dual-glass display.



That dual-glass screen is a 5in IPS panel with an HD resolution of 1280x720 pixels and a Gorilla Glass protective top layer. To give you an idea of its clarity, the Hammer's 294ppi pixel density falls just short of the 326ppi of the iPhone 6. It's very bright and very colourful, with excellent viewing angles. Further protection is afforded by the slight lip to the screen bezel.

Available in black or white (and supplied to us in white), the UMI Hammer is a nice-looking phone. The 13Mp camera juts awkwardly at the rear, but this is becoming increasingly common in today's ever-thinner smartphones. The Hammer is a super-slim 7.9mm, and despite its tough chassis just 159g.

With a 5in screen and slim bezels, it sits nicely in the hand, aided by the slight curve to the Hammer's rear. UMI refers to this polycarbonate cover as being as smooth as a baby's bottom; it's not the first thing that springs to mind, but it is indeed smooth to the touch. Pleasingly, it's also removable, and gives access to an also-removable battery, dual SIM slots and a microSD card slot.

The volume rocker and power button are well-positioned for use with the right thumb, but the rear-facing speaker is muffled by the palm. Three Android-standard touch-sensitive buttons lie below the screen, while you'll find a Micro-USB charging port and 3.5mm headphone jack on the top edge.



Hardware and performance

At this price you shouldn't expect top-end hardware, but you'll be pleasantly surprised by what you do get for just £93 - and that is middle-of-the-road performance at a budget price.

Inside the UMI Hammer is a 1.5GHz MediaTek MTK6732 chip, a 64-bit quad-core processor based on the ARM Cortex-A7. This is paired with 2GB of RAM and 16GB of storage, of which some 12.5GB is available to the user (and, of course, you can add up to 64GB via microSD). ARM Mali-T760 MP2 500MHz graphics complete the package.

As well as our usual benchmarks, we ran the UMI Hammer through AnTuTu, a popular Android benchmark that takes into account CPU, RAM and GPU performance, as well as the user experience. In this test the Hammer recorded 32,506 points, putting it in the same class as 2013/2014 flagships including the Google Nexus 5, LG G3 and HTC One.

In Geekbench 3, we saw 728 points in the single-core test and 2203 multi-core, showing better single-core performance but slightly lower multi-core performance than UMI's octa-core Zero. The Hammer took the lead in SunSpider and GFXBench, however, with 18fps recorded in T-Rex, 8fps in Manhattan and 1020ms in Google Chrome for JavaScript performance (865ms when tested using the preinstalled browser).

UMI has taken a super-strong aviation-grade metal chassis and fixed to it an also-tough polycarbonate shell and dual-glass display

The UMI Hammer is fitted with a 2250mAh removable battery that we expect to offer a full day's usage. However, we're still running our battery life benchmark and will update this review once it has completed. UMI claims the Hammer can handle nine hours of 4G internet browsing, 11 hours of video playback, 28 hours 2G call time or 42 hours of music playback.

Connectivity

The Hammer covers most bases connectivity-wise, with support for 802.11b/g/n Wi-Fi networks and Bluetooth 4.0. It also supports OTG, but rather than NFC you get MediaTek's HotKnot. Metal-chassis phones often struggle with obtaining a signal, and although the Hammer has a plastic rear cover UMI has opted to install a separate GPS receiver. This means the Hammer supports both GPS and A-GPS, and UMI claims 35 percent better efficiency because of this.

Mobile network coverage is important when buying a phone from overseas, and you should check the UMI Hammer is supported by your UK mobile operator's network. The Hammer operates on GSM 850/900/1800/1900MHz, WCDMA 900/1900/2100MHz and FDD 800/1800/2600MHz.

Not only is it a nice surprise to find 4G connectivity in a phone this cheap, but the UMI Hammer is also a dual-SIM phone, accepting one micro-SIM and one full-size SIM. It operates in dual-standby mode.

Cameras

The UMI Hammer has a 13Mp rear camera with f/2.2 aperture and a dual-LED flash; it can also shoot HD video. In our initial tests at the default settings we found detail was lacking, but by turning on Anti-Shake we got a better picture from our windy seventh-floor London roof terrace. It was only when we switched on HDR that we got a really decent image, though. With HDR on the UMI Hammer shoots pictures to be proud of, with excellent detail and truthful colours.

The camera settings require a little bit of getting used to, with options such as Anti-Shake greyed off when you turn on Smile Shot (which we found was on by default). You can also slide in from the left of the screen to access real-time previews of filters, and configure the camera to take a photo when you say "Capture" or "Cheese".

A 3.2Mp f/2.2 selfie camera is fitted to the front of the Hammer. You can turn on Face Detection and Face Beauty mode, with options to reduce wrinkles and whiten your skin tone. As with the rear camera, real-time previews are available for filters.

Software

As we mentioned in the introduction, the UMI Hammer supports Rootjoy – and that's great news for Android enthusiasts. While the UMI Hammer runs Android 4.4 KitKat out of the box, Rootjoy removes the need to wait for new updates to come to your device and allows you to install a new ROM in a couple of clicks. Rootjoy is a Windows program that you install on your PC or laptop, then plug in the UMI Hammer over USB to access options for quickly installing updates, flashing a new ROM of your choice (including Android Lollipop and MIUI6), installing a custom UI or backing up important data.


If you decide to stick with KitKat, you'll find a stock implementation with full access to Google Play. If you want Google apps such as YouTube or Gmail simply download them from here.

A few additional apps are preinstalled, including SuperSu, which is an app that allows advanced management of apps that require root access, a file manager, notebook,

music and video playback apps, SuperCleaner – an optimisation utility – and the WeCal calendar.

Open the Settings menu to access Smart Wake and Gesture sensing menus, with the former including such options as a double-tap to wake the screen and the drawing of alphabetical characters in standby mode to quick-launch apps of your choosing; the latter lets you use gestures to do things like call contacts directly from a text just by putting the UMI Hammer to your face.

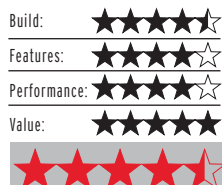
Verdict

The UMI Hammer offers fantastic value at £93, with 4G connectivity, a decent HD display and a reassuringly tough build. The camera takes a great shot with HDR turned on, and we particularly like the ease with which you can mess around with custom UIs and install new ROMs.  Marie Brewis



£79 inc VAT**Contact**■ vodafone.co.uk**Specifications**

5in (720x1280, 294ppi) IPS touchscreen; Android Lollipop 5.0.2; Qualcomm Snapdragon 410 processor (quad-core 1.2GHz Cortex-A53); Adreno 306 GPU; 8GB storage (plus microSD support up to 64GB); 1GB RAM; Bluetooth 4.0; 8Mp rear facing camera, LED flash; 2Mp front-facing camera, video recording at 1080p at 30fps; A-GPS; 141.7x71.9x9mm; 155g

**SMARTPHONE****Vodafone Smart Prime 6**

Vodafone has entered the world of budget 4G-enabled smartphones with the £79 Smart Prime 6. With such a small price tag our expectations were low, but we were pleasantly surprised.

Design and build

Although the Smart Prime 6 is aimed at the budget market this isn't obvious from its looks. The phone is made from plastic but has a hint of premium design, not looking dissimilar to the Samsung Galaxy S4 (although more bulky). It's available in two colours - silver and grey - though there's little difference between them. Vodafone would have done better offering a completely different colour option.

Unsurprisingly, it's bulkier than the likes of the iPhone 6 at 9mm thick and 155g, but is still thinner than its main rival, the £109 Moto E 4G, which is 12.3mm thick and costs around £109. It's also worth mentioning that just because it's bulky, it doesn't make it any less comfortable to hold - in fact, the curved edges of the Smart Prime 6 allow it to fit snugly in your hand.

It measures 141.7x71.9mm and houses a 5in display, giving it a 67.7 percent screen-to-body ratio, which isn't a bad for a smartphone that costs well under £100. The display is one of the better features of the Smart Prime 6; it's crisp and clear, has a full 720p HD resolution and IPS technology, which allows for better viewing angles at almost any angle. It's also better than the Moto E 4G's 4.5in screen in size and resolution, which has a 540x960-pixel display.

We feel that the screen size is just right too, providing adequate real estate to watch videos and play games without becoming uncomfortable to use one handed.

For those among you that look for a phone with a removable back cover, you're in luck. This snaps off to reveal the battery, along with a SIM card tray and a microSD card

slot that supports up to 64GB of extra storage, offering double the capacity of the Moto E 4G's microSD card slot. If, however, you're thinking about swapping out the battery, you're out of luck - even though the back cover is removable, this is sealed off and removing the cover will void the warranty.

Hardware and performance

Under the covers, the Smart Prime 6 has a quad-core 1.2GHz Qualcomm Snapdragon 410 processor. It uses the Adreno 306 GPU, a graphics processor that won't play processor heavy mobile 3D games smoothly, but is more than enough for casual games. In our tests, it ran Temple Run and Sonic Dash without any issues or lag. In fact, there wasn't much in terms of lag anywhere at all when we tested the phone.

The Smart Prime 6 has 1GB of RAM and 8GB internal memory, around 5GB of which is usable after Android Lollipop 5.0.2 has been installed. A microSD card slot is available for anyone who needs up to 64GB more storage.

When we ran our benchmarks, we were pleasantly surprised with the performance results we got from such a budget phone. In our Geekbench 3 tests, the Smart Prime 6 scored of 1401 in its multi-core component, narrowly being beaten by the Motorola Moto E 4G's score of 1463. It's single core component scored highly too, achieving a score of 464, matching the score of the Moto E 4G.

In SunSpider, a JavaScript benchmark, the Smart Prime 6 achieved a laggy score of 1301ms, with similar results in terms of graphics performance. We ran GFXBench and the Smart Prime 6 only managed 9.4fps in T-Rex and



3.8fps in Manhattan, beaten by the Moto E 4G's 13fps in T-Rex and 6fps in Manhattan, making the Moto E 4G the better option for gaming.

The AnTuTu score was 21,842, and marked the Smart Prime 6's general performance as 'high performance', surpassing 60 percent of other devices, as well as average battery performance and a poor game experience. Though the game performance was marked as poor, it still surpasses the 40 percent of other budget devices, an impressive feat for a sub-£100 smartphone.

Connectivity

One of the biggest selling points of the Smart Prime 6 is its 4G connectivity, allowing people to access faster internet without having to fork out hundreds for a new phone. Along with 4G connectivity, it also offers Wi-Fi 802.11 b/g/n, Bluetooth 4.0, NFC, GPS and FM radio functionality. It can also be used as a mobile hotspot, giving you access to 4G speeds on a Wi-Fi only tablet.

Cameras

The Smart Prime 6 has an 8Mp rear-facing camera with a maximum resolution of 3264x2448 pixels. Standard features include auto focus and an LED flash. As you can see

One of the biggest selling points of the Vodafone Smart Prime 6 is its 4G connectivity, allowing people to access faster internet



from our test shots (above), photos were impressive for such a budget device, with decent exposure and detail. The only issue we had was with compression - when we zoomed in and looked closely, the detail disappeared. While this is expected on such a cheap phone, it's still slightly disappointing.

The stock camera app offers different shooting modes - panorama, sport, HDR and night. For anyone interested in photography, you're able to set the camera to manual mode. This lets you set the ISO, exposure, flash, white balance and focus mode, giving you better control over your photography and allowing you to achieve better looking images than those produced in Auto mode.

The rear-facing camera also supports video recording at full 1080p HD, but while it looks good, the lack of optical (or digital) image stabilisation means that videos are a shakier than we'd like.

The Smart Prime 6 also has a 2Mp front-facing camera, perfect for selfies or video calling on Skype. Plus, it records at 720p HD.

Software

Apart from the Vodafone branding that's apparent throughout the operating system, the Smart Prime 6 runs a standard version of Android Lollipop 5.0.2. There are only two Vodafone specific apps installed on the smartphone - Vodafone Store and Updates. Think of the Vodafone Store as the phone's hub, where you can easily



access your data allowance, minutes, texts, and so on, as well as use the Vodafone Message+ app.

The Updates app is where you go to, to keep your Vodafone specific software up to date. You can subscribe to notifications when a new app becomes available, or when you need to update an existing one. Apps currently available include Vodafone's SmartPass, the networks pay-as-you-go mobile payment service that allows you to pay using your phone (via a sticker that Vodafone will send you) at any contactless payment terminal.



Verdict

The Vodafone Smart Prime 6 is a great budget smartphone that we think is worth more than the £79 that Vodafone is asking for it. Its processor may not be able to compete with grey-market phones such as the Doogee F1 Turbo Mini, but it handles day-to-day use just fine with no noticeable lag. While the Moto E 4G performed slightly better during our benchmarks, the Smart Prime 6 has a bigger screen, better camera and is £30 cheaper, making it our choice out of the two handsets.  **Lewis Painter**



£349 inc VAT

Contact

uk.blackberry.com

Specifications

BlackBerry 10.3.1; 3.5in (720x720, 294ppi) display; Dual-core Qualcomm MSM 8960 running at 1.5GHz; 2GB RAM; 16GB storage (SD card up to 128GB); full qwerty keyboard; touchscreen; trackpad; 8- and 2Mp cameras; USB 2.0, 802.11 a/b/g/n, Bluetooth 4.0, NFC, LTE, HSPA+, Quad-band GSM/GPRS/EDGE; 131x72x10mm; 182g

Build: ★★★★★
Features: ★★★★★
Performance: ★★★★★
Value: ★★★★★



SMARTPHONE

BlackBerry Classic

The Classic is a smartphone that is, depending on your viewpoint, another sign of BlackBerry's renaissance, or the final nail in an already doomed company's coffin.

The Classic is the latest handset from BlackBerry. But unlike the Passport that was the company's previous headline grabber, the Classic is quite literally a classic BlackBerry. A smartphone with a hardware qwerty keyboard. A squat black slab with 'BlackBerry' at the top and a keyboard at the bottom.

The Classic looks exactly like you remember every BlackBerry looking. It's both shorter, thicker, heavier and more rounded than you expect from a modern smartphone. We measured it at 131x72x10mm, and it weighed in at 182g on the *PC Advisor* scales. (BlackBerry claims 178g, and we are not going to fall out about 4g.)

Compared to flagships such as the Galaxy S6 Edge, the HTC One M9 or - yes - the iPhone 6, the BlackBerry Classic is not blessed with conventional good looks. But beauty is in the eye of the beholder, and those looking for a BlackBerry will have truly met their match.

In the hand, it feels like a sturdy and well balanced device. You need the relative bulk to make use of the qwerty keyboard, and it has to be said that having never been a BlackBerry fan we quickly got to grips with typing on the BlackBerry Classic. If you type a lot of text, and you want to do so one-handed, the BlackBerry Classic will be good for you. That thick 10mm mid-rift feels thicker than it ought, but it adds to the pleasing heft and solidity of the device. Around the side we see a silver metallic strip, which features volume and power buttons on the top righthand side, and speakers and a USB port at the bottom.

On the left as you look are SIM- and SD Card slots, and at the very top is the 3.5mm audio jack and a power/home button. The back of the BlackBerry Classic has a curved and textured plastic finish. The centre is set a silver BlackBerry logo. At the top we find a thin reflective strip that features the word 'Classic', and to the left the camera lens and flash.

But the front of the Classic is what you will spend your time

looking at. This features the classic BlackBerry fascia. The screen takes up around 60 percent of the front, the keyboard sits beneath it. Above the screen is a thick bezel which contains the word 'BlackBerry', a speaker grille, and the front-facing camera aperture.

Overall the effect is of black and silver - black, plastic and metallic finish. The Classic looks smart if a little staid. It feels sturdy if bulky, and will certainly stand up to a life on the road. And it is most recognisably a BlackBerry. And unlike the BlackBerry Passport it feels perfectly balanced in the hand. So much for looks and build: let's get into the important stuff.

Display and keyboard

So there's a keyboard. And on a relatively low-slung smartphone, that means you lose some screen real-estate. As with much that is interesting about the BlackBerry Classic, this will either repel or intrigue you.

The Classic has a 3.5in display, but it is a screen unlike any other (apart from the BlackBerry Passport). That is because - like BlackBerry's phablet with keyboard - the Classic's display has a 1:1 aspect ratio. That's right, it is perfectly square. Next to virtually every other display on every other smartphone that may seem like a bad thing. But the BlackBerry Classic is unashamedly a productivity tool. Indeed, its main function is as an email and messenger tool.

The screen is brilliant for reading- and responding to email, pretty good for browsing websites. Because it isn't as big as is the Passport the Classic's screen is not as good for reading and editing spreadsheets, but it offers a passable experience. Just don't watch movies, play games, or look at photos. Not if you have an aversion to seeing two thirds of the screen taken up by black borders, anyway. In terms of consumer entertainment we live in a widescreen world.

The display isn't as high-end as is the Passport's, either. A resolution of 720x720 pixels offers a now-upper-middle-class pixel density of 294ppi. We couldn't honestly say that we found the sharpness to be lacking



when using the Classic, in part perhaps because we weren't going to watch video or look at photos anyway. The shape of the display somewhat precludes that.

Ah, the keyboard. Since the iPhone appeared in 2007, the very idea of a hardware keyboard on your smartphone has seemed passé. Really, who needs one? But we praise BlackBerry for returning to its strengths: it may be that very few people want a keyboard on their phone, but those that do will want the BlackBerry Classic.

And it is a good keyboard. The keys are aligned in four rows, with a thin silver line in-between each. The keys are each textured in such a way that very quickly you can type without looking. To the uninitiated BlackBerry typist having to hit Alt in order to type numbers and symbols is a pain, but a pain that you quickly get over. The keys give pleasant and useful feedback, and feel robust enough to last.

Specs and performance

Let's talk numbers. The Classic is built around a dual-core chip. A Qualcomm MSM 8960 running at 1.5GHz. This feels relatively underpowered in a quad-core world, but it is paired with a healthy 2GB RAM. And we can't honestly say that the Classic is a slow or underpowered smartphone. Far from it. In use, it feels responsive and zippy. We wouldn't rely on it to play powerful games, but that is not why you would purchase a BlackBerry.

We tend to take synthetic benchmarks with a synthetic pinch of salt, but it is nice when they back up our user experience. That wasn't the case here, as the BlackBerry Classic turned in a series of flat performances. Running Geekbench 3 on the Classic straight out of the box we found a single core average score of exactly 500, and a multicore score of 928. To put that in context, the Moto E 4G gets around 450 and around 600, so the Classic out powers one of the better budget phones. (The Moto G has a much worse single core score, and a much better dual-core.) But it is hardly stirring stuff.

We also ran the SunSpider JavaScript benchmark to test JavaScript performance and general responsiveness, and again found a disappointingly poor result. In this case an average score of 2638ms. In this test a lower number is better, and we have only ever tested a handful of devices with slower results. In truth, web browsing does occasionally feel a little tardy on the Classic. But, again, we can't honestly say we thought it was this bad.

Connectivity and storage

The Classic comes with 16GB of onboard storage, which can be added to with a microSD memory card of up to a further 128GB. In our review unit, however, with nothing installed we had use of only 10GB of storage. This is not appalling or even unusual, just something of which to be aware.

It charges and connects via a Micro-USB 2.0 port and, as with Androids and Windows Phones, you can mount your Classic as external storage via your PC or Mac.

You get 802.11 a/b/g/n wireless, as well as Bluetooth 4.0 and BlackBerry's own flavour of NFC. Cellular connectivity comprises LTE, HSPA+ and Quad-band GSM/GPRS/EDGE. Sensors include accelerometer and gyroscope.

Camera

As we may have mentioned, the BlackBerry Classic is no-one's idea of a multimedia powerhouse, and this is certainly true of the cameras. For a start, you have to get used to taking square photos. It is a strange sensation, although not without its own merits when photographing people, animals or still lives.

Around the back you have an 8Mp camera with auto-focus, a five element F2.2 lens, and a mere five times digital zoom that isn't really worth your brainspace. There is a flash, and image stabilisation. You can capture 1080p HD video at 30 fps. Around the front we find a true webcam: a 2Mp fixed-focus camera that offers 720p HD video recording and another, pointless, 3x digital zoom. (Just stand closer.)

Software

Let's take a look at the software: BlackBerry 10.3.1. The traditional review of this is to say it has unusual swipe navigation, no apps, and great server side support for system administrators. Well the first element is true: it takes a bit of getting used to but in time it feels intuitive to swipe from the sides, or the top and bottom, to get to the home page or the BlackBerry Hub. And despite pressure from Windows Phone, BlackBerry remains the gold standard for running a fleet of devices for a business. Data can be secured and deleted, software updates pushed out remotely. Your system admin will always thank you for choosing a BlackBerry.

The apps thing has definitely improved since BlackBerry started including the Amazon App Store. Spotify is there, for instance, as are native apps for all the major social networks. We could even install Geekbench and benchmark the Classic (which BlackBerry may live to regret). But you will find odd misses - we couldn't see a YouTube app that was made by Google, for example. If you are purchasing a phone for app support BlackBerry is not the way to go. In general, however, BlackBerry 10.3 is good to look at and easy to use. It is very similar to recent Android and iOS. And this is not the phone to buy if you are looking for loads of apps and media. Clearly not.

Things we like about BlackBerry 10.3: in-window email notifications let you read and either dismiss or click to respond to messages as they come in, regardless of what you are looking at. True multitasking is possible because of that square screen and the fact that a simple swipe lets you see all open apps in an array of nine windows.

We've also grown to love BlackBerry Blend, the desktop-side

software that allows you access information from your BlackBerry Classic. So you can hit the road with your laptop and the Classic, and use your laptop as your email client by hooking up the Classic. It's old school, but hugely effective.

Battery life

We found we could comfortably eke the Classic through a day and a half or even two days of use. It has a large-for-this-spec 2515mAh battery, a small screen, and being principally a communications device we weren't tempted to drain the battery with games or video.

Verdict

If you want a smartphone with a keyboard, and you want it purely for messaging and calls, with a little web-browsing thrown in, the BlackBerry Classic is the perfect device at an excellent price. A five star product. But general smartphone users will be frustrated by the relatively low power, and the paucity of screen space. If you are a BlackBerry fan, you will love the Classic. Otherwise there are better deals elsewhere. ☒ **Matt Egan**



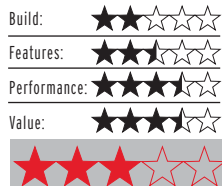
£99 inc VAT

Contact

■ homeretailgroup.com

Specifications

8in (1280x800, 189ppi) IPS glossy touchscreen;
1.83GHz Intel Atom Z3735G;
Intel HD Graphics; 1GB RAM;
32GB internal storage;
802.11a/b/g/n Wi-Fi;
Bluetooth 4.0; 1x Micro-USB 3.0 port; microHDMI;
microSD card slot (up to 32GB); mono speaker;
0.3Mp webcam; 2Mp main camera; built-in mic;
3.5mm headset jack;
Windows 8.1 with Bing (32-bit); USB mains charger included;
123x215x8.6mm; 336g



TABLET

Bush MyTablet

At first glance, you wouldn't think that the MyTablet costs £99. It has a similar design and level of build quality to a Nexus, with no obvious corner cutting. It has an 8in IPS screen, 32GB of storage and a quad-core Intel Atom processor.

One of the reasons for the low price is that this tablet runs Windows 8.1 with Bing. This is a free version of the operating system, which means there's no cost for a manufacturer to install it on its tablet. To all intents and purposes, this is a normal 32-bit version of Windows, so you can do almost everything you can do on your laptop or PC with it.

We say almost because the MyTablet doesn't have a mouse or physical keyboard, nor a standard USB port to connect a printer. However, the Micro-USB port that's used for charging also works with OTG gadgets, such as flash drives, and you can connect a keyboard and other devices.

Next to the USB port is a microHDMI connector, which means it's easy to hook up the tablet to a big screen. Just behind this, sunk into the top of the rear cover is a microSD slot, which can be used to add storage up to 32GB. Inside is single-band 802.11n Wi-Fi and Bluetooth 4, but no GPS or NFC. Most buyers will be unphased by those latter two absentees, and more welcoming of the free year's access to Office 365 and the 1TB of online storage in OneDrive.

Display

The 8in screen has a resolution of 1280x800 – the norm for budget tablets – and it's a reasonable example. Colours are generally accurate and the touchscreen is responsive, but it isn't the brightest nor does it have the best viewing angles. It's a huge step up from the worst screens we've seen on tablets that use TN panels, though.

The Intel BayTrail processor makes the MyTablet quicker than you should reasonably expect for £99. Windows runs surprisingly well with no stuttering or annoying delays as you go about your business in either the Modern UI (more on that in a minute) or the traditional desktop.



It completed the browser-based SunSpider test in dead on 500ms. Geekbench 3 revealed scores of 711 and 2078 in the single- and multicore tests respectively. These aren't too far behind more expensive tablets: the iPad mini 3 scored 2484 in the multicore test (even if it roundly beat the MyTablet in the single-core test with 1374).

Intel HD Graphics are integrated into the Atom, and they're also more powerful than you might think. GFXBench returned scores of 19fps in the T-Rex test and 11fps in Manhattan, and while these are by no means the highest we've seen, they're still good at this price.

Battery life is pretty much what Bush claims: our HD video looped for six hours eight minutes over Wi-Fi. That's not quite as long as the more expensive Tesco Hudl 2 (which also has an 8in screen) and is one of the main weak points of the Bush MyTablet.

Software

As we've said, you get full Windows 8.1, albeit the 32-bit version rather than 64-bit. You can install and run any Windows 32-bit software you like, although trying to use Excel with only your fingers is frustrating.

Really, though, this isn't meant to be a mini Windows PC but a tablet. The fact that you have access to the old Windows desktop is almost irrelevant. Instead, you're supposed to use the Modern UI and install apps from the Windows Store.

This is where the cracks begin to show. We've never liked the 'Metro' interface and things are worse when you get down to an 8in screen. Buttons and icons aren't scaled up to make them easier to use: everything is just smaller. The only bonus is live

tiles. Plenty of people dislike them because they're distracting, but we think some are genuinely useful, such as the News app, which scrolls through the headlines. But compared to Windows Phone 8, which was designed to be used on small screens, Windows 8 is a poor alternative to Android or iOS.

Worse still, the choice of apps is limited. Yes, the big names are largely present, but you won't find an official app for Amazon Prime Video, for example. There are no official Google Apps – a limitation shared with Amazon devices – and while there are Xbox Video and Music apps, there's no Spotify app.

In essence, you'll have to rely on a web browser for a lot of the time – a sub-par experience compared to the well-designed apps you'd find on Android and iOS.

Finally, remember that you can't connect a Windows tablet to your PC or laptop and transfer files with a standard USB cable. You either have to buy a special OTG cable or share files over a home network using Windows file sharing (Homegroup) or a cloud service such as OneDrive.

There are front and rear cameras, but they're poor quality. The 0.3Mp front camera is a webcam for Skype use, and the rear one (2Mp) is best left unused except in emergencies as the photo quality is utterly dire.

Verdict

Since the MyTablet comes with 1TB of online storage and year's subscription to Office 365, plus a second install for another device, it's a great bargain if you were going to buy 365 anyway. The tablet itself is good for the money, but we simply don't like Windows 8.1 as a tablet operating system. **✗ Jim Martin**

£215 inc VAT**Contact**

■ wellograph.com

Specifications

1.26in (168x144) low-power LCD; integrated backlight; Tri-LED HR Sensor; 9-axis accelerometer Bluetooth 4.0; Micro-USB; 210mAh battery; 42x33x12.5mm; 55g

Build: ★★★★★
 Features: ★★★★★
 Performance: ★★★★★
 Value: ★★★★★

**SMARTWATCH****Wellograph**

The Wellograph is an activity tracker, stopwatch, pedometer and heart-rate monitor that rivals the Apple Watch in the design department. It also has one of the best fitness-tracking displays we've seen on a smartwatch.

It measures steps with its 9-axis pedometer. That's more movement sensors than its rival wristband the Fitbit Surge, though it lacks that device's altimeter, which measures your stair- or hill climbs. The Wellograph's stopwatch helps you track distance, speed, lap times, and movement intensity.

An impressive four months of exercise sessions can be stored on the Wellograph, and you can check these out through the equally good-looking app (compatible with iOS, Android and Windows Phone).

As you can see from the image above, the Wellograph is a fantastic-looking watch, and wouldn't look out of place at a black tie event.

The Apple Watch is closest when it comes to good looks, but is more expensive - the entry-level model will set you back £299. While it has a wider selection of apps, it suffers from poor battery life - at less than two days, it's weak compared to the Wellograph's seven-day battery.

Some may find it a little too showy for jogging or working out though, and sports wristbands such as the Fitbit Surge seem better suited for exercise fanatics.

The 1.26in (168x144) display is black and white, with an integrated backlight. It knocks the running socks off even the Fitbit Surge's screen (which looks clunky in comparison), with beautiful clock faces, activity graphs and animated pulse graphs. While it's not as colourful as the Apple Watch's Activity app, it's pretty enough in white on black. You navigate via two side buttons, which is a little clunky to begin with - we'd have preferred a more swipeable touch-sensitive display.

The Wellograph is available in Silver Satin (brown leather strap), Black Chrome (black strap) and White Pearl (white strap).

Fitness wristbands need to have heart-rate monitors these days, and the Wellograph's works well. In fact, its Tri-LED Heart Rate Sensor



replicates the action of a doctor using his fingertip to feel a pulse.

What makes heart-rate monitoring more than just interesting is the ability to gauge how hard your are exercising. Wellograph calls this Cardio Time, and it can encourage you to push yourself that little bit harder.

It also measures heart-rate variability for assessing the effects of stress on your body, as well as preventing injury from overtraining.

Like Fitbit's Charge HR and Surge, the Wellograph automatically measures your sleeping patterns and tells you how you slept: sleep time, duration and waking. While Fitbit's wristbands are hardly noticeable at night, the Wellograph's chunkier design isn't comfortable to wear in bed.

Syncing

One aspect of the Wellograph experience that we found irritating was syncing with the phone app. The Bluetooth sync isn't kept continuous as with many other trackers. The device's manufacturer believes this saves battery life, and that users need not sync so often when they can see all the info on the device's display.

Although we understand this, we still found the process a little fiddly, even after a couple of weeks of use. To sync your Wellograph, you'll need to turn off the Bluetooth on your phone, turn it on in the watch, turn it back on the phone and press the watch in the settings area. Then you can open the app and sync there. It's a couple of steps too far to call this seamless.

Also, the sync requires the watch's 210mAh battery have a 35 percent charge at the very least. The company told us that

the reason for this is to make sure the device isn't bricked while carrying out a firmware update, or lose data during a sync. This is the same reason why you need to have your iPhone plugged in when you perform an update, but then why not require the same of the Wellograph? After all, how many times do you have to download new firmware versions?

You power-up the Wellograph using its proprietary charging dock, which connects to a power source via Micro-USB.

The Day view on the app shows 24 hours of the current day, while the Week view show seven days of the present week. If you want to look back further, you'll need to go to the Month view where the device reveals the entire month, as well as the historical, most recent six-month trend.


At present, the app doesn't let you look for a certain day or month's detailed data. The company told us it will probably update this, so that you can see your previous seven days and the preceding ones, for example.

All your data is, however, still there and can be exported to other services such as Apple Health, RunKeeper, and MyFitnessPal.

The graphs and display on the iPhone, Android and Windows Phone apps are as gorgeous as on the display. You can see detailed stats analysis on Activity, Hear, Sleep, friends league, and Sessions.

One essential for fitness trackers is the ability to compete against friends, and this is possible with the Live feature. You'll need to find friends with a Wellograph, though.

Verdict

As a very fancy, classy-looking watch that tracks your exercise and heart rate, the Wellograph is probably better suited to the more affluent, fashion-conscious wearer rather than the sporty fitness fanatic.  **Simon Jary**

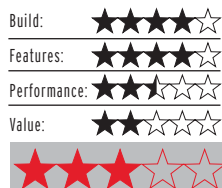
From £299 inc VAT

Contact

apple.com/uk

Specifications

WatchOS; 1.32in screen 340x272 pixels; 1.5in screen 390x312 pixels; Apple S1 chip; 8GB storage; IPX7-certified water resistant; Ambient light sensor; accelerometer; gyroscope; heart rate; Bluetooth 4.0 Low Energy (LE); Wi-Fi 802.11b/g/n 2.4GHz (system use only); claimed battery life of 18 hours; 38.6x33.3x10.5mm or 42x35.9x10mm; 25- to 69g



SMARTWATCH

Apple Watch

The Apple Watch is the tech giant's first new product category in five years. The obvious question is whether it can make an impact as great as that of 2010's market-changing iPad. Early sales have been strong, but it remains to be seen whether Apple's influence will be enough to reinvent the wearable market, and make it mainstream.

Design

The Apple Watch is beautifully designed and engineered, with a great look and feel. Its chunky body is faintly reminiscent of – although much smaller than – the original iPhone, yet simultaneously modern-looking. The Apple Watch is also comfortable on the wrist.

Three designs are available – Apple Watch, Apple Watch Sport and Apple Watch Edition. Each of these is available in two wrist sizes – 38- and 42mm.

The underside of the watch is convex: it bulges outwards slightly. The watch will still sit pretty flat, with that curved section pressing slightly into your wrist, but there will be gaps between the skin and watch/strap at the top and bottom of the watch's body. This effect is more pronounced with the 42mm model, and will also vary from person to person.

We found that the Apple Watch was heavier to wear than our old traditional watch, but we quickly got used to it; and to be honest, it's not as heavy as we expected.

Other than the touchscreen, you can interact with the Apple Watch via two hardware controls. There's a largish protruding dial on the righthand side of the watch, which Apple calls the Digital Crown; this echoes the design of traditional watch crowns, and can be turned to scroll through onscreen options, or pressed to switch on the screen, confirm a choice or go to the Home screen. There's also a side button underneath the Digital Crown, which calls up your favourite contacts for quick calls and texts, and also lets you power off the device.

The Apple Watch is rated as water- and splash-resistant to the IPX7 standard, which means it should survive in water up to a depth of one metre for up to 30



minutes. Wearing it in the shower is therefore fine, but Apple officially advises against taking your watch swimming, even though plenty of people have done exactly that.

Display

The 38mm Apple Watch has a 1.32in screen with a resolution of 272x340 pixels, while the 42mm model's 1.5in screen is 312x390. Both models therefore have a pixel density of 326 pixels per inch: that's sharp, with no visible pixellation. It's also pleasingly bright and vividly colourful.

The touchscreen aspects work well too: the Apple Watch is highly responsive, and after a little testing we found we preferred to swipe through screens even when a scrolling option was available via the Digital Crown.

The display also is able to determine how hard you touch the screen. It can distinguish between a regular tap, used to select things, and a harder press (or Force Touch), used to access contextual menus.

User interface

While scrolling is smooth and the touchscreen responsive, there are so many ways to trigger particular actions that some testers have found it a bit complicated. It's not always clear whether you should tap, scroll, swipe or push.

The watch will notify you when you receive emails from VIPs, text messages, and other information on your iPhone. It does this with a sound effect, much like an iPhone, but it also 'taps' you on the wrist. These taps feel peculiar until you get used to them, but they do their job: they're difficult to ignore.

You can control the Apple Watch using Siri, which will switch on when you press and hold the Digital Crown or use the command: "Hey Siri". You can place calls, set alarms, ask for directions, check football scores and cinema listings, and launch apps.

Voice control is also an option when responding to a text, if you don't want to choose from the list of pre-written replies. Siri will attempt to convert your speech into a written reply – which isn't always perfect, but in quiet surroundings we've been generally impressed by its accuracy. Alternatively, you can just send the unconverted audio.

The Apple Watch runs apps, much as the iPhone and iPad do, but these are heavily cut down for the miniature interface. Apple has shrunk down some of the most common apps, including Messages, Mail, Weather, Calendar, Maps, Passbook, Music and Photos, and there's already a wide range of third-party apps. The watch can't, however, run Safari.

Fitness

For many Apple Watch owners, the most appealing and frequently used apps will be the two preinstalled fitness offerings.

The first of these, Activity, tracks your movements throughout the day. It records calories burned, the number of minutes spent exercising briskly, and how much you've been standing up – all of which is displayed through a simple interface.

You can set the device to ping if you haven't stood up for the first 50 minutes of an hour, which has got us out of our seats a little more, and the video-game-style achievements you get for meeting or exceeding targets on multiple days are silly but motivating, too.

We've found, however, that the Stand ring is sometimes hard to convince that you are indeed standing up: jumping around a little generally does the trick.

For more dedicated exercise sessions, the Workout app comes into its own. This is a more conventional fitness tracker app, measuring and recording how far you've run, your pace and heart rate, and the calories burned. It's pleasingly frictionless and quick to get going, particularly once you've used it a few times – the app will remember the target you set last time and allow you to jump straight to that if you wish.

Accuracy is a problem at first, since the Apple Watch doesn't have built-in GPS, but it can piggyback on the GPS of a nearby iPhone: spend 20 minutes running with both Apple Watch and iPhone, and it'll calibrate itself, learning vital information about your stride length. This is supposed to improve accuracy for future runs, and our experiences bear this out.

Before calibration a 5km treadmill run was recorded as just 3.8km, and a 5km outdoors run as 4.2km. After 20 minutes of calibration with iPhone and Apple Watch together, a third 5km treadmill run came up as 4.8km. That's an increase in no-iPhone accuracy from 76- to 96 percent.

Phone calls

You can easily place or answer calls from your wrist by pressing the Side Button and selecting a contact. (Alternatively, you can open the Phone app on your watch and place

the call from the Favorites, Recents or Contacts screens.) The Apple Watch includes a microphone and speaker, but you could use a synced Bluetooth headset.

Sound quality in our tests was fine, at least when talking indoors or in quiet settings. It can be difficult to hear, or make yourself heard, in noisier environments.

Maps

The preinstalled Maps application feels like it has a lot of potential. It offers the possibility of discreet turn-by-turn navigation, tapping you on the wrist when a turn is coming up. Our experiences with the app have, however, been disappointing.

One member of our reviews team decided to plot a route to Marylebone, and found that Maps was quite keen to proceed along Euston Road. No thank you, she thought, switching to a different road with a more pleasant back-street route. Sadly, Maps failed to establish a new route to fit these requirements, deciding that our reviewer was still on Euston Road: all the directions it gave were related to the original unwanted route.

As usual, your mileage is likely to vary depending on where you test out the Maps app, but we're not convinced that it's bug-free yet.

Battery life

Apple claims that on a typical day, with typical usage, you should get 18 hours of battery life.

In fact, your experience may vary. We had a couple of spectacularly bad days, where the power was all used up by late afternoon, seemingly caused by a few power-hungry apps that made regular contact with the iPhone to update information. But being more careful about the apps that we kept running sorted this problem, and the vast majority of days saw us get through the full 18 hours without coming close to zero percent. Most of the time the watch was on around 20- to 30 percent battery power when we set it charging overnight.

Price


If you're interested in buying the Apple Watch, you'll need to shell out £299 for the entry-level model, with prices going all the way up to an eye-watering £13,500 for the most expensive option.

While £299 might not sound like an extortionate amount of money to spend on a first-generation product, it's unlikely that's how much you'll actually spend. If you want a watch with a more durable Sapphire display and Stainless Steel chassis, you're looking at £479 or more. And don't forget that's for the 38mm display. The Sport model with the bigger display costs £339, while prices for the Stainless Steel Apple Watch with a 42mm display start at £519.

That's why we're finding it very difficult to recommend buying this first-generation smartwatch. Particularly when Android Wear alternatives such as the LG G Watch R and Motorola Moto 360 are so much cheaper.

Verdict

The Apple Watch is an attractively designed smartwatch – people with a bit of fashion sense might actually choose to wear one – and a lot of thought has been put into creating a software interface that's equally appealing. But you should be warned that it isn't completely intuitive, particularly at first. To an extent this comes with the territory, of course: unlike widely understood smartphone traditions, smartwatch usage conventions haven't been established yet. And in any case, the interface becomes more familiar and user-friendly once you've spent a little time with it.

Is this a device that you really need? The answer to this is no, but we've been struck by the number of small conveniences that we missed as soon as we stopped using it.  **David Price**



€169 (£119)

Contact

■ huawei.com/en

Specifications

Compatible with Android 4.0 or later; iOS 7.0 or later; 0.73in (128x88) display; Bluetooth 3.0; Micro-USB charging; A+G sensors; 95mAh battery; 22x11.8mm; height, leather strap version 235.10mm, TPU plastic version, 242.85mm; leather strap version, 32.2g; TPU plastic version, 30.6g

Build: ★★★★★
Features: ★★★★★
Performance: ★★★★★
Value: ★★★★★



ACTIVITY TRACKER

Huawei TalkBand B2

Huawei has unveiled a new version of its TalkBand, the B2, a wrist-worn fitness tracker that also doubles as a Bluetooth headset.

The first thing you'll notice is that the design has been significantly improved since the B1, both in terms of looks and practicality. The original TalkBand was plasticky and cheap-looking, whereas this version looks much more stylish and sophisticated, from the strap and the device itself, through to its packaging.

There are three designs to choose from: black and white offerings with plastic straps, and a gold option with a leather strap.

The tech is housed within the removable portion of the device. This pops out easily when you squeeze the two buttons on the strap, and is simple to pop back into place. We're happy to see that Huawei has improved the design to make it easier to remove and replace the earpiece, something we found frustrating with the B1.

We also like the fact that the screen becomes invisible when not in use, making the TalkBand B2 look more like a bracelet-type accessory than a piece of tech. Twisting or raising your wrist will cause the screen to illuminate.

It's been slimmed down, too – measuring 11.8mm compared to the B1's 15mm – though we still found it a little chunky for our liking. Most smartwatches are a little on the thick side compared with regular watches, but the TalkBand

looks significantly thicker, which many will find off-putting.

In terms of fitness tracking, the B2 has everything you'd expect from a smartband. It tracks your steps and distance, and estimates the amount of calories burned using the built-in 6-axis sensor.

This detects the type of exercise you're doing, such as walking, running



and cycling, and can also be used to monitor your sleep. All of this information can be accessed via the 0.73in touchscreen, which is clear and responsive.

The accuracy of the B2 seems to be on par with the likes of other fitness trackers we've tried, and measures how many calories you've burned. You can also set yourself a goal, and once this is reached, the TalkBand buzzes, displays a fireworks animation and awards you a trophy.

You can take a look back at your past activity by opening the dedicated iOS or Android app. This offers day- and month views.

The B2 can also measure your sleep patterns, letting you know how long you slept, and whether that was deep- or light sleep. Unfortunately, we found that the TalkBand was too uncomfortable to wear in bed, and so took it off.

Earpiece

The TalkBand's Bluetooth earpiece for hands-free calling has divided opinion here in the office. It actually makes a lot of sense – certainly more so than talking to your wrist.

But using a Bluetooth headset feels as though you're stepping back in time, especially since you can get headphones with a built-in microphone. Huawei is aware of this and has announced that it is to launch the TalkBand N1 – in-ear headphones that offer pretty much the same functionality as the B2 aside from the touchscreen.

The first time someone called while we were testing the B2, we were notified by the device's vibration alert. We found it a little fiddly to get it to sit in our ear to begin with, but soon got the hang of it. The quality of calls is great, and those contacting us said they hadn't noticed a difference in sound quality from our end. Once the

call was over, we didn't have any problems popping the earpiece back into the wristband.

You can turn on notifications for messages, but this didn't seem to work for us and the manual didn't offer any help. A quick check online offered no answers either – Huawei's support documents are lacking (in fact, they're non-existent). Anything else, such as Facebook notifications or emails, won't show up at all – you'll have to check your phone for.

You can, however, set an alarm on the TalkBand to wake you up in the morning, and use the device to help find your phone if it's fallen beneath the sofa.

The B2 is also water- and dust resistant, so you don't have to worry about it while you're washing your hands. We wouldn't recommend wearing it in the shower, though, particularly if you've got the leather strap.

To charge the device, you'll need to use the provided Micro-USB cable. This plugs into the port on the back of the removable portion of the device, so it's always hidden while you're wearing it. The TalkBand takes around an hour-and-a-half to charge, and this should last for four- to five days.

Verdict

The TalkBand B2 is an enormous improvement over the B1 in terms of design and practicality, but we're still not sure we'd buy one. It's an opinion divider, but we think for a (probably small) number of people, this device is going to be really exciting, and exactly what they've been looking for. You'll know if you're confident enough to wear and use the Bluetooth headset in public, and if you are, this smartband could be an excellent investment as it does its job brilliantly and looks good while doing so. **Ashleigh Allsopp**



£486 inc VAT**Contact**■ wd.com/en**Specifications**

8TB NAS drive; 2-bay NAS enclosure; My Cloud OS 1.06.127; 2x WD Red 3.5in SATA HDD; 1.3GHz Marvel Armada 385 dual-core ARM processor; 1GB RAM; 2x gigabit ethernet; 2x USB 3.0; 48W external power supply; 216x109x148mm; 3.5kg

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**NAS DRIVE****WD My Cloud EX2100 8TB**

Disk storage giant WD has expanded its mid-range line of NAS boxes, adding some needed performance to the range with the new EX2100 and EX4100 models, offering two- and four disk bays respectively. The underpowered My Cloud EX2 and EX4, the original two- and four-bay models, remain but with these new additions to the Expert Series WD is promising decent file write performance – the Achilles' heel of all budget NAS boxes.

The EX2100 is based on the My Cloud software platform, using a now-mature customisation of a Linux-based operating system that is rippling with useful features.

WD has adapted the versatile BusyBox Linux package, adding its own graphical interface, and feeding back its changes by releasing the modified source code as required by the GPLv2 licence. The version employed with WD's current 1.06.127 firmware is based on Linux kernel 3.10.39, with BusyBox 1.20.2 from July 2012.

The hardware to house the disks and processor is more up to date and wholly new – a compact and neatly packaged black box with metal wraparound cover and gently moulded front plastic fascia.

The disks are easily accessible from the front, released by levers but with no additional locking to prevent prying fingers from popping a disk. Rather than mount the disks in extra caddies or trays, the raw disk slides into the bay, with a strong spring to keep it held firm once the door has been clicked shut. At the back of the unit is a single 65mm cooling fan, almost silent in normal use, and combined with the quiet operation of the WD Red hard disks inside we have a usefully low-noise storage solution.

Powering the EX2100 and helping to keep heat and noise down is a low-power ARM processor. The Marvell Armada 385 is a new system-on-a-chip with dual-core 1.3GHz processor, backed with 1GB of memory.

Two USB ports are available, both to USB 3.0 specification, one on the front and one on the back. There are two gigabit network ports too, available for use together for link aggregation to increase

throughput or for failover security.

Power comes from an external laptop-style 48W mains adaptor, which connects to a single DC inlet on the rear.

Overall build quality is excellent, with high standards of fit and finish, making a sturdy unit with no creaks or rattles.

The My Cloud firmware is a comprehensive operating system and user interface. From the main page, you have a useful overview of the essential working parameters – starting with available capacity in huge numbers, a photograph of the hardware exterior and tick boxes to demonstrate system health and firmware version.

Along the top line is a running strip of icons for digging deeper, such as User, Shares, Backups, Storage and Settings. Also available is an Apps tab, where you can download and configure additional applications to expand the unit's capabilities. Here we found offerings from WordPress, Dropbox and Acronis, as well as two more BitTorrent clients (aMule and Transmission) available as alternatives to WD's own built-in BT software.

Under the Storage tab, you can configure the disk arrangement; with just two disks in the EX2100 you can set these to RAID 1; RAID 0 for largest single-volume capacity and best potential speed; and JBOD for separate addressable volumes. There's also an option for Spanning, which combines the two disks in a linear fashion to swell capacity without striping.

The My Cloud EX2100 proved to be significantly faster than its cheaper My Cloud predecessors in sequential data read and write speeds. Where the EX4 struggled to reach 100MB/s read speeds, and limped along with writes down at about 37MB/s, the EX2100 came closer to filling a single gigabit ethernet link – that is, transfers up to around 120MB/s.

We tested the model with two 4TB WD Red disks in its



default RAID 1 arrangement; first in Windows over SMB using CrystalDiskMark storage benchmark. Here we saw sequential transfer results of 103MB/s for reads and 109MB/s for writes. Smaller 512kB data flew by too, at 100- and 97MB/s respectively.

Digging down to the more challenging 4kB file level however, the EX2100 struggled to keep up its earlier pace – 4kB random reads and writes were down to 9.9MB/s and 4.2MB/s respectively. But these figures compare well with Synology's budget DS115j, for example, which recorded similar 4.4MB/s read speed for 4kB files but just 2.7MB/s write speed. In the 32 queue-depth test for 4kB random data, write speeds were unchanged but random reads rose to 51.5MB/s.

ATTO Disk Benchmark reported sequential maximums of 118MB/s for both reads and writes for all data above 128kB in size. And 4kB sequential IO here was up to 26.8MB/s reads and 22.2MB/s writes.

Power consumption was low, as we would hope from an ARM-powered NAS drive. With the unit stressed with various file transfer tasks, we saw a maximum of 18 W power consumption.

Verdict

The EX2100 is a snappy NAS drive brimming with useful features. At around £200 unpopulated it's close in price and performance to the Synology DS214. It's perhaps testament to the progress WD has made with its NAS hardware that it's now a tougher call to choose between them. **Andrew Harrison**

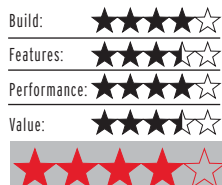
£192 inc VAT

Contact

■ freecom.com

Specifications

256GB portable flash drive; mSATA SSD; USB 3.0 with built-in cable; protected to IP55 for water and dust resistance; 87x53x17.2mm; 70g



PORTABLE DRIVE

Freecom Tough Drive Mini SSD 256GB

Freecom has had a tough drive in its range for a while now, literally dubbed the Tough Drive - a portable hard drive with chunky rubber armour to protect it against shocks and drops.

More recently, the drive went solid-state, an option added of a 2.5in SATA SSD with 256GB capacity. Now we have the Tough Drive Mini SSD, taking an mSATA SSD inside to allow it to shrink to just 87mm long.

The Tough Drive Mini SSD looks exactly like its larger namesake, just scaled down to more diminutive proportions with the help of the baby mSATA device inside, itself only around 50x30mm and under 4mm thick.

Putting an SSD inside the Tough Drive's rubber jacket is a real belt-and-braces protection plan, since the SSD itself is almost impervious to shock and vibration - the bouncy coating was devised in earlier times with delicate hard disks in mind, which do need care in handling; especially when powered up.

The Tough Drive Mini SSD inherits its predecessor's built-in cable with USB plug, which neatly folds inside and is secured by a magnet when not in use. It certainly helps prevent the loss of the cable at a critical moment. And where we found the old full-size Tough Drive cable to be short for comfort much of the time, the Tough Drive Mini is annoyingly undersized.



The cable is stiff, with a 90-degree bend engineered into the plastic shank which you must tug to straighten to get the plug away from the drive body. If you have a laptop perfectly flat on the desk, it's just about long enough to reach into most USB ports. But raise your computer on a stand or platform and the drive will be left

to 4m looks almost conservative - given the SSD with no moving parts inside, the thick rubber and plastic jacket outside and the overall low weight, we'd anticipate being able to drop this from the top of our seven-storey office and still have a working drive at the bottom.

Two capacities are available, 128- or 256GB, and the colour finish

The Tough Drive's rubber jacket is a real belt-and-braces protection plan, since the SSD itself is almost impervious to shock and vibration

dangling in the air. Fortunately, at 70g it won't immediately strain the supporting USB port enough to break it.

Freecom advertises this Tough Drive as compliant with IP55 standard for dust- and water resistance. The specification of resistant to bumps and drops up

is the same as all other Tough Drive models from Freecom - grey silicone rubber jacket, black hard plastic end cap and a light blue stripe that encircles the drive.

Performance

When used with a recent Windows PC, you can expect to see read speeds around 400MB/s, and write speeds some way behind at around 280MB/s.

Tested in Windows with CrystalDiskMark, we saw top sequential transfer speeds of 415MB/s read and 287MB/s write. Small files were handled swiftly, at 159- and 74MB/s respectively for 4kB random read and writes at queue depth 32.

Verdict

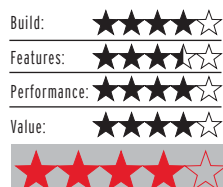
The smallest Tough Drive from Freecom performs well in data transfers, and the drive inside is very well protected from just about any daily abuse. If you need fast and reliable storage in a small armoured case, the Tough Drive Mini SSD is the drive for the job.

✉ Andrew Harrison



From £79 inc VAT**Contact**■ uk.tp-link.com**Specifications**

TL-PA8010PKIT: HomePlug AV2 standard compliant; high-speed data transfer rates of up to 1200Mb/s; 1x Gigabit port per adaptor. Integrated power socket. TL-PA8030PKIT: HomePlug AV2 standard compliant; high-speed data transfer rates of up to 1200Mb/s; 3x Gigabit port per adaptor

**POWERLINE ADAPTOR****TP-Link AV1200 Gigabit Passthrough Powerline Adaptor Starter Kit**

Most of us nowadays have either a smart television, Sky+, Apple TV, desktop computer or laptops, games consoles, or Tivo DVR. Or most of the above. These come with ethernet ports on the back, so you can get super-speedy internet connections for catch-up TV, over-the-internet gameplay, or web access.

But your internet router/modem is usually in a different room to all these digital home-entertainment devices. And who wants to stretch ugly ethernet cables all over their house? This is where a Powerline network comes in.

One of the best-known providers of such adaptors is TP-Link. Here we review the company's AV1200 Starter Kit, which uses the latest fast Powerline chips to make it one of the fastest we've tested.

TP-Link has two versions of its AV1200 Gigabit Passthrough Powerline Starter Kit. The £79 TL-PA8010P has one Gigabit Ethernet port on each adaptor (pictured above), while the £88 TL-PA8030P Kit (pictured below) has three sockets.

Both options are subtle white in colour, and are larger than many Powerline adaptors. This is because they have a power socket on the front, which is handy since it means you don't give up a valuable wall



socket by using these adaptors. The ethernet ports are located at the top of the adaptor, which is handy if your power sockets are close to the floorline.

Setting up a home network is easy. Plug one Powerline adaptor into the wall socket near the router,

have tested: the uglier but cheaper Solwise SmartLink 1200AV2 (107Mb/s) and larger but more costly Devolo 1200 (104Mb/s).

Every house is different, so you may get faster speeds than this, but we test all Powerlines in the same house for comparison purposes.

Every house is different, so you may get faster speeds than this, but we test all Powerlines in the same house for comparison purposes

and then connect the adaptor to the router via ethernet cable. Then take the other Powerline adaptor and plug that into a power socket near the TV, Xbox, and so on. You can now connect these to the second adaptor via another ethernet cable. In between the two adaptors, your home's electrical wiring operates as the ethernet cable.

We put our review unit through two tests. The first of these involves plugging an adaptor into a power socket and then transferring a large file from one computer to another. On this test, the AV1200 equalled our previous top speed of 410Mb/s, by transferring a 1GB file between PC and laptop in 20 seconds.

Our next test adds the second adaptor, which is placed a couple of floors away from the first one. Here, the TP-Link AV1200 managed just over 100Mb/s, which is only slightly slower than the other two Gigabit Powerlines we

Powerline speed is also heavily affected by what else is using your home writing at the time. Battery chargers and microwaves will noticeably slow Powerline speeds.

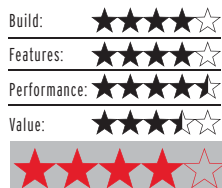
Verdict

The TP-Link AV1200 Gigabit Passthrough Powerline Adaptor Starter Kit matches its rival Gigabit Powerline adaptor sets in our real-world speed tests. We prefer the only slightly more expensive TL-PA8030P as it has three Gigabit Ethernet ports, compared to the TL-PA8010P's single port adaptors. Neither version, however, includes functionality to add a new Wi-Fi hotspot in your house, as some other Powerline adaptors do. That said, if your Wi-Fi signal is acceptable, you can live without a new hotspot, and the TL-PA8030P especially represents great Powerline value. **Simon Jary**



£249 inc VAT**Contact**■ honeywelluk.com**Specifications**

Modular smart heating system; app available for iOS and Android

**SMART THERMOSTAT****Honeywell Evohome**

At its most basic, Evohome is just like Nest. If you want to, you can buy a single zone connected thermostat pack (Y87RF2024/ RFG100) for under £140, install it yourself and it will work almost exactly as Nest and Netatmo's (page 70) thermostats do.

This isn't Evohome, though. It's merely one of the components used in an Evohome system. It comprises a T87RF wireless room thermostat, a BDR91 wireless relay and an RFG100 'mobile access kit' which connect to your router and makes the system controllable via the internet and Honeywell's Total Connect Comfort app.

Such systems measure the temperature at one location (typically in the hall, just like your old thermostat) and heat the whole house until the thermostat reaches the set temperature, called the set point in heating jargon.

To avoid any one room becoming too hot, these systems rely on you already having thermostatic radiator valves (TRVs) installed. These shut off the radiator when the desired room temperature is reached, although you only have a dial that runs from 1 to 5, so you have to figure out which setting is best by trial and error. Your radiators may not have TRVs, of course. They could have a simple knob that you set manually to fully open, fully closed or somewhere in between.

Where smart heating systems really get smart is when you replace these knobs or TRVs with smart TRVs. Like 'dumb' TRVs they have built-in thermostats but can be controlled remotely. This is a huge advantage as it means you can have control over the temperature of each room without having to walk around your home turning individual radiators up or down manually.

The bad news is that smart TRVs are expensive. If you have 10 radiators you want to control, that's £500 before you've added the cost of the controller, relay and installation.

This is why it makes sense to only control those radiators in rooms you spend the most time in. TRVs can also be grouped

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RECOMMENDED

into 'zones', so you could have an upstairs zone and downstairs zone, and set each to different temperatures at different times of day. You might want to group all bedrooms as a zone, for example, and set it so they're only heated first thing in the morning and just before everyone goes to bed.

While such a setup can save money in the long run, it takes a big initial investment.

Test system

We had an Evohome system installed into a large house in order to test out its full capabilities, controlling both radiators and underfloor heating (UFH). Honeywell has a system builder tool that helps you work out which components you need for your home. You tell it how many rooms you want to control, the type of heating in those rooms and whether you have a combi boiler, water tank or other heat source.

In our test home, the system builder advised three room thermostats, 10 smart TRVs, a UFH controller, hot water kit, mobile access kit and a base pack (the touchscreen controller).

The UFH controller can handle five zones, but is upgradeable to support eight zones if necessary. To save money, you can group UFH actuators into one zone: you don't need to have each one on a separate zone. The UFH controller works with the T87RF wireless room thermostats to maintain a constant temperature in those rooms or zones.

Such a system needs professional installation, which took

a full day. Not all our radiators had compatible valves for the TRVs, so some had to be changed over using pipe-freezing packs. The existing UFH controller had to be swapped out for the Honeywell one, and the sensor and relays installed for the boiler and hot water tank.

Despite thick stone walls and long distances from the Evohome controller to the furthest TRVs, there were no wireless connectivity problems. We did have to move the RFG100 as the controller couldn't connect to it where we originally placed it next to the broadband router. However, using a pair of existing powerline adaptors we were able to relocate it to a more central position in the house.

How it works

The Evohome controller does the bulk of the work and lets you program a schedule as well as adjusting zone temperatures whenever you want to make a change. It can also act as a room thermostat on its own. The controller can be wall mounted, but since it requires mains power most people will prefer to leave it on its tabletop stand.

There's an internal battery so you can slide it off its stand and use it completely wirelessly, but it's more convenient to use the iOS or Android app. Unfortunately there are only unofficial apps for Windows Phone and BlackBerry, which lack the full set of features.

Using the controller or app, you can create zones by grouping TRVs and thermostats. This allows you complete freedom to set up the system as you like. The controller

supports up to 12 zones which is enough for most people, although it becomes restrictive if you have underfloor heating in addition to lots of radiators and want to control everything separately. It's the most customisable smart heating system we've tested.

The TRVs have more settings than you'd imagine, too. Their displays are on a hinge so they can be angled upwards to make it easier to read, and they're also backlit. Using the built-in controls, the temperature can be overridden manually, but there's also a lock function to prevent children (or guests) from changing the temperature. It's also possible to set upper and lower limits, as well as recalibrating the thermostat so the temperature reads higher than it actually is, for example.

They take two AA batteries which should last a year, and you can even tell the TRV which type of batteries are installed. As with the Heat Genius system, they can detect if a window is open and automatically shut off the radiator to prevent wasted heat.

If they have to be installed inside a radiator cabinet, or in a cramped corner, you can choose to monitor temperature from a room thermostat instead of using the TRV's stat.

Both the app and controller display the temperatures for each zone and you can rename these to match your home. If you have a hot water tank, you can also monitor the water temperature. A Quick Actions button brings up options to turn the heating off, tell the system you're away (and therefore maintain a minimum temperature), have a day off (ignore the usual schedule and keep the heating on) and a handy Economy button, which lowers all zones by three degrees.

Naturally, everything is customisable so you can set the periods for which quick actions apply and their associated temperatures.

Creating a schedule can be done in several ways. A wizard guides you through the process, or you can do it manually. As you'd expect, you can have separate schedules for each day and each zone.

If someone overrides the temperature using a room thermostat, the controller or a TRV,

it will revert to the set temperature at the next heating period.

Many people worry about what happens if their internet connection goes down. With Evohome – as with all internet connected thermostats – you lose remote control from the app. However, the controller will stick to the schedule and you'll still be able to use the TRVs, thermostats and controller to adjust the temperature. You'll receive an automated email telling you the connection has been lost, and another when it is restored.

Limitations

While Evohome is the most comprehensive system we've seen, it doesn't tick every last box.

One is that there's no presence detection. If you go out and forget to change the schedule, the system will heat the house regardless. Those with a regular routine won't be affected, but if you never know when you'll be in or out, then Tado or indeed Honeywell's own Lyric system could be a better choice for smaller homes. The good news is that you can get around this thanks to Evohome's support for IFTTT. Using the free app, you can set up any triggers you like, so it's possible to turn off the heating when you leave the house by virtue of your phone's GPS location.

For some people, manual scheduling is exactly what they want: they have complete control over their heating schedule and there isn't a "system with a mind of its own". If you want to set a heating period of 20 degrees from 7- until 9am, the boiler will fire up at 7am and maintain that temperature in that zone until 9am.

However, Evohome is far from dumb. If you prefer, you can use the Optimal Start and Stop feature which will ensure each zone reaches the set temperature by the start of the heating period. This means that if it's cold outside and the room is a few degrees cooler than usual the boiler will fire up earlier to get the room up to temperature in time.

Since Evohome learns how long

it takes for each zone to heat up and cool down, it can also stop the boiler early rather than continuing to heat right up until the end of the heating period.

Verdict


While you'll get fine control over the temperatures in each zone, having several zones means the price quickly scales to a point where it will be years before you break even and begin to save money.

But despite the cost, Evohome is a fantastic system for those who want to control temperatures in different rooms, have control over their hot water and also those with underfloor heating. It's particularly good for larger homes with few occupants where you might want to heat only certain rooms at certain times.

It's very easy to use, even for technophobes, and although it can take a while to set a schedule in the first place, making tweaks is quick and simple.

The Base Pack (touchscreen controller and boiler relay) is good value at around £160, but when you start adding the TRVs at £50 each, underfloor heating controllers at £270, internet gateway at £50, room thermostats at £140, hot water sensors at £80, costs mount up fast.

There's a sweet spot for some if you can get away with a small selection of TRVs, a controller and internet gateway. And you'll certainly save money if you're prepared to install it yourself. Then, when funds allow, it's easy to expand the system.

If money is no object, we can highly recommend Evohome. For virtually everyone else, a Tado or Nest with dumb TRVs is a more affordable option.  **Jim Martin**



£140 inc VAT**Contact**■ netatmo.com**Specifications**

Requires internet connection (Wi-Fi); app available for iOS, Android and Windows Phone 8; thermostat dimensions: 83x83x22mm. In the box: thermostat mobile stand and wall bracket; relay boiler adaptor; mains adaptor; mounting plate USB cable; 5x colour adhesives; 3x AAA batteries; screws/screws anchors

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**SMART THERMOSTAT****Netatmo Thermostat for Smartphone**

Alongside some of the big names in smart thermostats – Nest and Hive to name just two – is Netatmo. We've already tested out the company's Urban Weather Station, and now it's the turn of the simply named Thermostat for Smartphone.

There are two types of smart thermostat. One controls the heating in the entire house and the other lets you adjust temperature in different zones. Netatmo, Nest, Hive and Tado fall into the former category and systems such as Heat Genius and Honeywell Evohome (page 68) fall into the latter.

This means you're likely to be considering the Netatmo alongside Nest, Hive and possibly Tado. All four systems allow you to control your heating remotely via a smartphone or tablet app (and in most cases on the company's website) and are more intelligent than the programmer you're likely to have in your home right now.

The Netatmo thermostat lets you set a different schedule for each day of the week, with no limit on the number of heating periods. It's possible to create, name and save different schedules and switch between them, so you could for example have a 'normal' schedule and 'off school' for half terms and holidays when you might want a different heating schedule.



Over the first week or so, the system will learn how quickly your home heats and cools and then offers you to switch to a new PID algorithm (proportional integral derivative). Instead of merely looking at the current temperature and comparing it with the set point (your desired temperature at that time), it will also take into consideration your home's insulation effectiveness as well as the exterior temperature, by using weather data from the internet or – if you have one – an Urban Weather Station outdoor module.

This means it can fire up the boiler early if it's colder than usual, or later if it's warmer. It can also more efficiently maintain temperature as it knows how long it takes before your home starts to cool down.

App

You can install the free app on your iPhone, iPad, Android phone or tablet (4.0 or later) or Windows Phone (version 8 or later). If you own none of these devices, you can use Netatmo's website.

From the app, you can adjust the temperature (set point) and put the system into 'Away' mode which essentially turns the heating off. There's also a Frost-Guard toggle, which maintains a minimum temperature even if you're away to prevent pipes freezing. At the bottom, you can see a summary of the current heating period, but you can also use a slider to manually override the current temperature with a different one for a certain amount of time – this can be

changed in the settings. There are advanced settings for temperature offset and hysteresis threshold, but few will need to adjust these.

Turn your device from portrait to landscape and you'll get a graph showing your home's temperature history. This is almost identical to the feature in the Urban Weather Station app. It shows your room temperature, the set point temperature and the amount of time your boiler was on (the orange bars).

While all this sounds advanced, other systems offer more. For example, the Nest display can sense whether or not anyone is in the house. This means if you go out and leave the heating on, it will automatically turn it off after a while to save money. Similarly, Tado uses your phone's GPS to detect when you leave home as well as when you're on your way back, so it will turn the heating on and off based on your location.

Installation

There are two ways to install the thermostat. One is a wired replacement for an existing wall thermostat, the other as a wireless thermostat. We were replacing a wireless thermostat, which meant connecting the relay box directly to the boiler. Using Netatmo's forum, we were able to establish which terminals to connect two relay wires inside the boiler; the other two wires connect to the mains supply inside the boiler.

The kit includes everything you need to mount the relay on the wall by the boiler, so you need to





supply only the tools. In total it took around 20 minutes to install the relay, but quite a bit of extra time to research how to do it beforehand.

We also had problems – just as with the Urban Weather Station – trying to configure Wi-Fi via the app. First, your phone pairs via Bluetooth with the relay and then attempts to copy your Wi-Fi configuration (including password) from your phone. This wouldn't work for us, so we had to configure it manually.

The relay and thermostat are paired in the factory, so once the included AAA batteries were inserted it was simply a case of attaching the plastic stand and placing the thermostat somewhere appropriate. The benefit of installing the system this way is that you can move the thermostat between rooms to ensure a comfortable temperature wherever you happen to be.

If you're replacing a wired thermostat, then you attach the Netatmo thermostat in its place on the wall. There's a plastic trim supplied to cover screw holes or old paint left by the old dial. Instead of connecting the relay to the boiler, you attach the supplied UK three-pin plug and connect it to a mains outlet somewhere with a decent Wi-Fi signal.

If the relay loses its connection to your router, or your internet goes down, it will carry on following the schedule you set until the connection is restored. If it was in Away mode, it will stay that way. You can still control the temperature from the thermostat, but not from a smartphone or tablet, since this has to connect to Netatmo's servers, which in turn

communicate with the relay via your broadband connection.

Display

Unusually, the thermostat has an E-Ink display. It shows the current temperature in outlined numbers, and the set point in black. You press the display at the top to increase the set point, and the bottom to decrease it.


An orientation sensor rotates the display so you can have it portrait or landscape, and there are five coloured stickers you can attach to colour code the thermostat according to your décor. Because it sits behind a textured

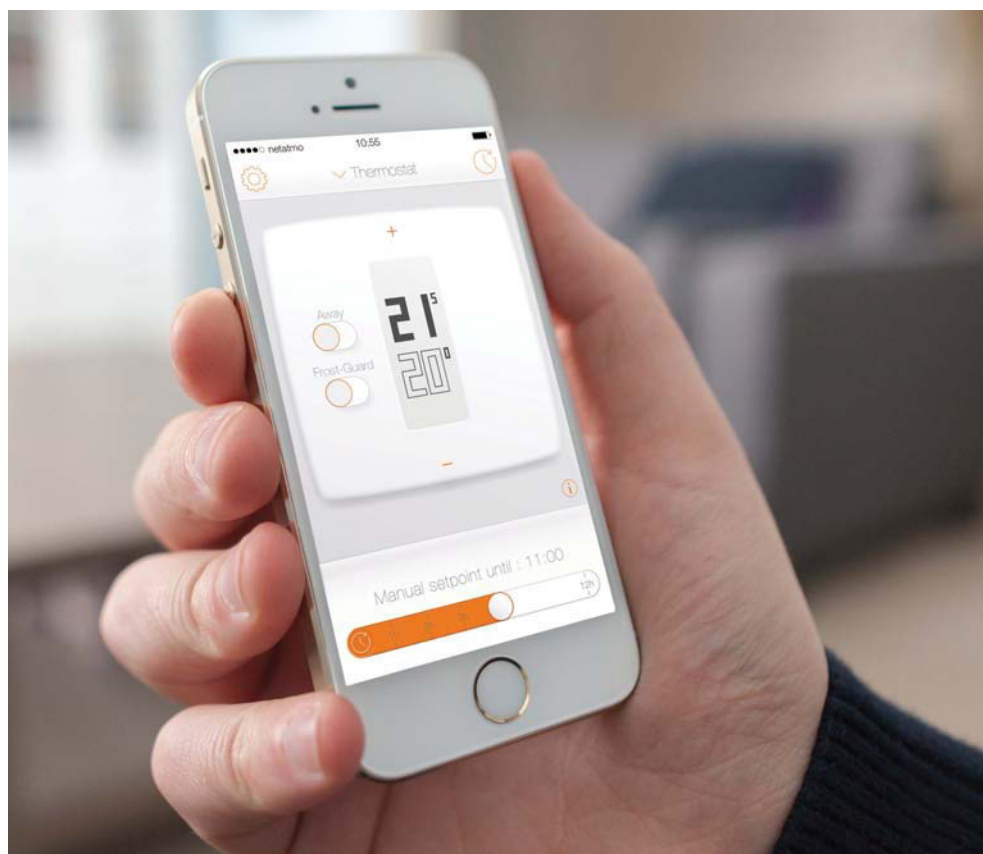
plastic cover, the display isn't as sharp as you might expect, and it doesn't show any other information, aside from an error when it can't connect to the relay. At least this is more information than the Tado thermostat shows, which is none, since it has no display.

E-Ink does have advantages, too. Since power is required only to update the screen, the batteries should last a full year. The bad news is that it isn't backlit, so you can't see it in the dark. We still prefer the Nest display, partly because it looks more hi-tech, but mainly because it offers a lot more information and control and it's easy to give it a spin to turn down the temperature as you're leaving.

Verdict

One thing in the Netatmo's favour is price. It costs around £140 online and there are no subscription fees to pay. If you're not confident installing it yourself, you can buy it from EDF, which will supply and fit it for £199.

However, if you look hard, you can get a Nest for the same price, and it's equally easy to install whether wired or wireless. (It's not strictly wireless as it can't run off batteries, though.)  **Jim Martin**



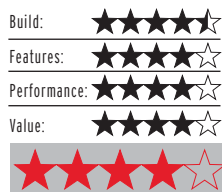
£13 inc VAT

Contact

■ oneplus.net/uk

Specifications

10,000mAh power bank; Sandstone Black or Silk White; 1x 10W (5V, 2A) Micro-USB input (charges in 5.5 hours); 2x 10W (5V, 2A) USB outputs; max total output 10W; shake-activated four-LED status system; auto-on; no carry case; no passthrough charging; 142.8x72.6x16.2mm; 220g; 1-year warranty



POWER BANK

OnePlus Power Bank

Power banks or emergency chargers are becoming popular companion devices for phones (and tablets) that struggle to make it through the day. OnePlus is the latest company to jump on the portable charger bandwagon, and we're pleased it did.

The OnePlus Power Bank is very nicely designed. Slim and lightweight, it'll feel just like a smartphone when slipped into a pocket. OnePlus fans will appreciate the finish - it's the same material as is found on the rear of the phone itself, rough like a carpet but soft to the touch - and with a matching silver trim these two devices will look great side by side. No carry case is supplied in the box, but it really doesn't feel as though this power bank would require one.

Not that you have to use the OnePlus Power Bank with a OnePlus One phone. There's a Micro-USB cable in the box, which should suit most Android- and Windows Phones. If you're using an iPhone you'll need to supply your own Lightning cable.

There are no buttons, keeping things simple. A gentle shake activates the four blue LEDs on the right edge, alerting you to how much power remains, while charging is automatic. Attach your phone or tablet, and the OnePlus will instantly begin charging it. Once the device's battery is full, the OnePlus is supposed to stop pumping out the power, preventing any being wasted. Unfortunately, we found this wasn't the case with our HTC Desire Eye - it stopped charging, but the OnePlus didn't switch itself off.

Charging is fast, too. With a 10W input and two 10W outputs, you'll probably charge your phone faster from the OnePlus than you would the charger it shipped with, and it'll refill its own battery in around six hours. Do note, though, that 10W is the max power output for the OnePlus Power Bank - if you're using both ports at once just 5W will be available from each, and some tablets - usually iPads - can



stubbornly refuse to charge under such conditions.

OnePlus claims an efficiency of "more than 80 percent" and says that its 10,000mAh Power Bank will recharge a OnePlus One three times. Given that it has a battery capacity of 3100mAh, it's unlikely that you actually can achieve three full charges, although you will get close.

Verdict

We really like the OnePlus Power Bank. We don't expect to find high-end features such as an LCD display and passthrough charging at this price, but the shake-activated LED status lights and auto-on functionality are welcome additions. **✉ Marie Brewis**

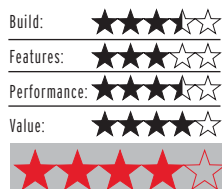
£15 inc VAT

Contact

■ amazon.co.uk

Specifications

5200mAh power bank; 1x 5W Micro-USB input; 1x 10.5W USB output; LED flashlight; soft carry case; auto-on/off: no; status indicator: 4 LEDs; passthrough charging: no; 46x25x100mm; 118g



POWER BANK

Omaker Power Bank 5200mAh

Power banks come in all sizes and capacities, and this Omaker Power Bank 5200mAh hits the sweet middle ground, small and light enough to carry in a pocket, with sufficient capacity to offer your phone at least one and possibly two full charges. It's also the perfect size for your pocket, just 46x25x100mm and 118g.

A soft carry case is provided, but the soft-touch rubber casing doesn't feel as though it needs much in the way of protection. We like the design, a smooth almost pebble-like block of grey or yellow coloured plastic with two sheets of black rubber that wrap around the front and back, creating a groove at each side that makes the Omaker power bank easy to grip. We reviewed the yellow version, but suspect the grey may look a little more premium.

There's just one output on the Omaker Power Bank 5200mAh, but it's a fast one, rated at 10.5W. This will charge your phone twice as fast as some phone

chargers, and it's powerful enough to charge a tablet, too.

If there's enough power in the bank, that is - rated at 5200mAh and allowing for around 30 percent loss through voltage conversion and heat generated, you can expect about 3640mAh to be available to your devices. How many times that will charge your phone depends on the capacity of its own battery.

Once the power bank's charge is depleted, there's a 5W Micro-USB input for refilling it. As is standard with power banks, no charger is provided in the box, but you can use the one that came with your phone or tablet. It could take up to six hours to completely fill the battery.

Although we can't expect otherwise at this price, there's nothing here in the way of fancy high-end features such as auto-on/off, which does mean you'll need to keep an eye on the Omaker Power Bank for when it's finished charging your device to ensure no charge is wasted. (You'll need to press the



button on the Omaker's side to begin charging, while a double-press will activate the handy built-in torch.)

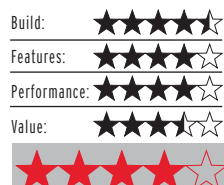
How much capacity remains is instantly visible by a row of four LEDs that glow blue when the power bank is in use. Each light represents 25 percent of the battery.

Verdict

Omaker's Power Bank 5200mAh is a no-frills emergency charger that could provide up to two full fast charges for your phone. It's a nice size to fit in a pocket, and it feels reasonably tough. **✉ Marie Brewis**

£249 inc VAT**Contact**■ bowers-wilkins.co.uk**Specifications**

Nylon damped diaphragm;
CCAW coil; changeable ear
cushions; detachable
cable; 3.5mm stereo mini
jack (CTIA 4-pole); 2x
40mm (1.6in) full range
drivers; 10Hz to 20kHz
frequency range; 22 ohms
impedance; <0.4 percent
(1kHz/10mW) distortion;
108dB/V at 1kHz sensitivity;
50mW max input; 1.2m
cable; 195g

**HEADPHONES****Bowers & Wilkins P5 Series 2**

Bowers & Wilkins is one of the most stylish brands in the audio world and is back with a new pair of headphones, an update to its flagship on-ear cans.

On the surface, not much has changed with these updated headphones. The P5 Series 2 look exactly the same as the previous model - which is no bad thing - so the real upgrades are on the inside and relate to the audio performance.

As you can see from our image, these headphones look great in the stylish and sleek combination of black and silver. Once again, the cups are leather-clad on the front and back, with the headband also making use of the material with almost invisible black stitching.

The back of the cups and the remaining construction is crafted from aluminium, and you can tell just from looking at these headphones that a lot of thought has gone into the design.

What's particularly impressive is how small and lightweight (195g) these headphones are, the cups don't stick out a mile.

Comfort is a big factor with any pair of headphones and especially on-ear designs. We found the cushions a little hard out-of-the box, but they soon softened after some use and become snug. These are cleverly held on with magnets (two small grommets hold them in place), so you can buy replacements if you happen to wear them out rather than needing to buy a new pair of cans. The other reason is so you can change the cable. One with an in-line control and mic is connected but a regular cable is also supplied. A soft travel pouch with hidden magnetic fasteners is found in the box, too.

While the P5 Series 2 are pretty comfortable, we did find the headband a little tight, pushing the cups inward with slightly too much pressure. This means during long listening periods we had to keep repositioning the pads.

Audio quality

With the design remaining the same as the original P5 headphones, all the work has been put into the improving the audio performance. The P5s use 40mm drivers - the same size as found in the firm's

over-ear P7 model, which costs £329 - and have a suspended diaphragm like a regular speaker.

Although the P5 Series 2 are closed back headphones they sound nicely open, but still do a good job of noise isolation, whether you're in the office and don't want to be distracted or trying to relax on the commute. You don't need to pump up the volume to uncomfortable levels to compensate.

By far the biggest improvement in the sound is at the top end. Cymbals sound particularly alive and crisp thanks to this change.

With a nice boost to the top-end, Bowers & Wilkins hasn't forgotten about the rest of the frequency range. The bass sounds great most of the time, with impressive power for small headphones, but can get a little out of control, occasionally allowing other elements to get somewhat swallowed up.


By far the biggest improvement in the sound is at the top end. Cymbals sound particularly alive and crisp thanks to this change


PC ADVISOR
RECOMMENDED

Mid-range is almost as impressive as the top-end, with bags of detail combined with warmth and balance. This makes these headphones versatile and great for long sessions.

Despite an impressive amount of audio quality, we're not sure we can hear the "giant leap forward" that Bowers & Wilkins touts. They are certainly better than the original P5s, but an upgrade for existing owners isn't a necessity.

Verdict

While original P5 owners don't need to jump at this upgrade, the P5 Series 2 are one of the best pairs of on-ear headphones we've tested. The price tag might be a little high for some, but Bowers & Wilkins has done a sterling job once again of combining design and build with decent comfort, noise isolation and excellent sound quality.  **Chris Martin**

£119 inc VAT**Contact**■ rockjawaudio.com**Specifications**

8mm dynamic and balanced armature; 20- to 20,000Hz frequency response; 110dB +/- 3dB sensitivity; 16 ohms nominal impedance; 3x pairs of grommets; 3x pairs of filters; soft carry case; 1.2m cable

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**HEADPHONES****Rock Jaw Kommand Hybrid IEM**

Anyone who knows anything about headphones can tell you the difference between balanced armature and dynamic drivers. Typically, headphones use one or the other but not both. Each has its pros and cons, with balanced armature delivering excellent detail and clarity for high frequencies and dynamic drivers offering better bass and warmth for mid-tones.

That's why Rock Jaw has gone for an 8mm dynamic driver as well as balanced armature in its flagship Kommand IEM. IEM is another headphone acronym, which stands for in-ear monitor. They're just ear buds to everyone else.

Of course, at £119, these aren't just ear buds. As well as their hybrid nature, they also have interchangeable filters just like the company's more affordable Alfa Genus earphones - priced £50. You get three sets of screw-in components which change the characteristics of the sound.

By default, the silver 'bass' filters are installed. These enhance low frequencies but, unlike with the Alfa Genus, not at the expense of treble clarity. If you prefer a neutral sound that doesn't favour low or highs, the champagne coloured filters might be the ones you use most of the time.

The black filters are called 'reference class' rather than 'treble' as with the Alfa Genus.

Design and build

The Kommand has a hand-built quality, being crafted from ebony



and aluminium. They use the same twisted cable as the Alfa Genus and have a built-in microphone and button on the left-hand ear-bud wire.

The button works with iOS, Android and Windows Phones to pause and skip tracks, as well as answering calls or calling up Siri with a long press on an iPhone.

You get a soft carry case in the box, but you'll be better off keeping the two sets of filters you're not using in the main box, as they're easy to lose if kept at the bottom of the carry bag.

The filters are larger than the Alfa Genus', but we struggled to tighten them. Some Loctite would help stop them constantly coming loose. Otherwise you risk dropping a filter with attached ear tip, something that happened to us, although fortunately in the office rather than while commuting.

Unusually, the ear buds have a metal hook that is covered in silicone for grip and comfort. They rotate because each person's ears are a different size, and rotating changes the distance between the bud and the top of the ear. They are not removable.

We found them hard to live with and not especially comfortable, and this was echoed by other testers around the office. You also get only three sizes of silicone tips and, unlike with the Alfa Genus, none were the perfect fit.

Sound quality

For good bass you need a tight fit, and this is why we recommend custom sleeves (accscustom.com/uk).

After running in the Kommands for the recommended 20 hours,

we were initially impressed with them. The level of clarity on offer means there's a great soundstage where instruments are well-defined and separated.

Depending on the quality of your music, you may hear sounds, effects and instruments you didn't even know were in a particular track. The down side is that you'll quickly want to replace poor-quality MP3s with better-quality versions.

With the bass filters installed, bass is good if you can get that perfect seal. It's punchy and tight and sounded great on everything from Michael Jackson's *Billy Jean* to Diana Krall's *Peel Me A Grape*.

The main criticism is that treble is a little harsh, and this is all the more noticeable when you turn up the volume.

Vocals, as we had expected, had a nice warmth to them and were clear with all three sets of tuning filters. Treble wasn't as brash with the black filters installed, but bass was understandably more subdued as well.

Verdict

Earphones are a highly personal product, and no one type or sound suits all. There's no doubt that the Kommand IEM is a step up from the Alfa Genus and they're good value given what you can spend on earphones with multiple drivers.

For us, we found the Alfa Genus more comfortable to wear and easier on the ears in terms of sound. You may love the ear hooks and prefer the extra detail from the balanced armature drivers, so it's well worth trying some out - if you can - before buying. **Jim Martin**



£199 inc VAT**Contact**■ www.wlmodel.com/English**Specifications**

13- to 15 minutes flight time; 60- to 100 minutes charge time; £22 for spare battery; 500m claimed range; 274x274x190mm; 770g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆

**QUADCOPTER****WLToys V303**

Although some would still call the V303 a toy (and that would be fair play considering the company name), this quadcopter is a real alternative to the DJI Phantom if you have limited funds.

Two of the key components missing from cheap quadcopters are a GPS and barometer. These are essential if you want your drone to hover when you let go of the controls. They're also crucial if you want to shoot higher-quality aerial footage, as you get a much more stable flight.

The V303 has both and – as is plain from looking at it – is a copy of the popular DJI Phantom. Compared to other WLToys quads, such as the V666 which we also reviewed, the V303 has a white body, white propellers and a white transmitter. It isn't an exact copy of the Phantom, though: the landing skids make it look much more like a lunar lander.

There are various models of the V303: we tested 'A' version, which comes with a GoPro mount, but there are others with included cameras, gimbals, and more. The mount is very basic and will accept a GoPro Hero 4 (or Hero 3), but not GoPro clones such as the Keecoo Wi-Fi sports camera, which is fractionally too deep.

There's very little assembly needed out of the box: you need only install the props and tighten the nuts with the included tools, remembering that two of them have counter-clockwise threads. There aren't any spares in the



box at all, so it's worth ordering at least one full set of blades along with the V303, just in case. GearBest.com which supplied our V303 for review, sells each pair of 9in blades for £2.87.

The plastic body and legs aren't strong and will almost certainly break in a crash (we broke a leg on the first flight), so you might want to order a couple of legs at £2.87 each as well. A replacement body costs about £30, but you can buy the upper and lower halves separately.

At this price, it's hard to complain, though, since you also get decent quality brushless motors and the well-respected ZeroUAV YS-S4 flight controller (which includes the GPS). The controller means there's a return-to-home function, which activates if communication between transmitter and drone is lost.

Our V303 is a later model, which shipped with the newest firmware and a wire sticking out of the underside. This is for easy connection of a camera gimbal. For around £60, you can buy a Walkera G-2D two-axis gimbal, which bolts directly to the V303. You can then add an action camera, such as the Keecoo, for a total spend of a little over £300 including import fees for the V303. That's a massive saving on the equivalent Phantom 2 with a Zenmuse gimbal and GoPro, yet with comparable quality video.

You'll need to do a little wiring and potentially soldering to connect the belly wire to your chosen gimbal, and it's well worth choosing one that is known to work with the V303, so you can control the camera's pitch from the stock transmitter.

What you won't be able to do compared to the Phantom 2 Vision+ is see a live feed from the on-board camera, nor start and stop recording remotely. Again, though, considering

the cost saving, these are limitations worth living with. (If you buy an iLook camera, you can view a live feed as this action camera also acts as an FPV camera.)

Flying the V303 is pretty much exactly the same as a Phantom. To start the motors, you pull the sticks downwards and outwards and then apply some throttle for take-off.

Bright blue and red LEDs under the arms mean you can easily see the quad's orientation, and a flashing status light on the rear tells you when there's a GPS lock. The first time you fly, you'll have to wait a few minutes for it to locate the satellites, but after that it gets a fix much more quickly.

The V303 is pretty stable, and can cope with light winds without too much trouble. It's pretty agile and fast, too, but it doesn't take much to push it outside of its comfort zone. When you're too ferocious with the controls, the status light turns yellow.

You can expect around 10- to 15 minutes of flying with the standard 2700mAh battery, and spares cost about £22. However, you can buy 2200mAh batteries with similar dimensions for one-third of the price, making them much better value (albeit a shorter eight- to nine minutes of flight time).

Recharging the standard battery with the flimsy-looking bundled charger takes a long time – almost two hours in our tests. This means spare batteries are essential.

Verdict

The WLToys V303 is a great alternative to a Phantom if your budget won't stretch. In fact, with a gimbal and camera, the V303 works out at roughly one third of the price. Spares are available from GearBest and aren't too expensive. **Jim Martin**

The law on using drones

When flying a personal quadcopter, you should be aware of the CAA rules which state that you must:

- **Keep it in sight at all times**
- **Not fly it within 50m of a person, vehicle or structure**
- **Not fly it within 150m of a congested area**

The laws surrounding the use of personal drone are still evolving but it's something of a minefield because it covers aviation law, data protection, privacy and even harassment. In essence, find an empty open area away from streets and houses. Parks are ideal, but make sure you keep well away from people and animals. If your quad has a camera, be careful not to share videos online, which include identifiable people.

For more information, see caa.co.uk/uav.

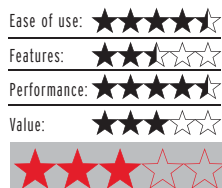
£60 inc VAT

Contact

■ avast.com/en-gb

Specifications

Windows XP SP2 32-bit,
Vista/7/8 all 32- and
64-bit, Pentium 3, 128MB
memory, 2GB hard drive



INTERNET SECURITY SUITE

Avast Premier 2015

Avast is one of the most popular IS applications available. Unlike AVG, which tries to persuade you to upgrade to a subscription version at any opportunity, Avast is proud of the fact that its basic version is free. Here, we're looking at the Premier version, though, which costs £60 for a one-year, three-PC licence.

For this, you get the core functions of AV, anti-spam, anti-malware, two-way firewall and online banking security. There isn't a backup module, though a Dropbox app loads and installs with its standard 2GB of free online storage.

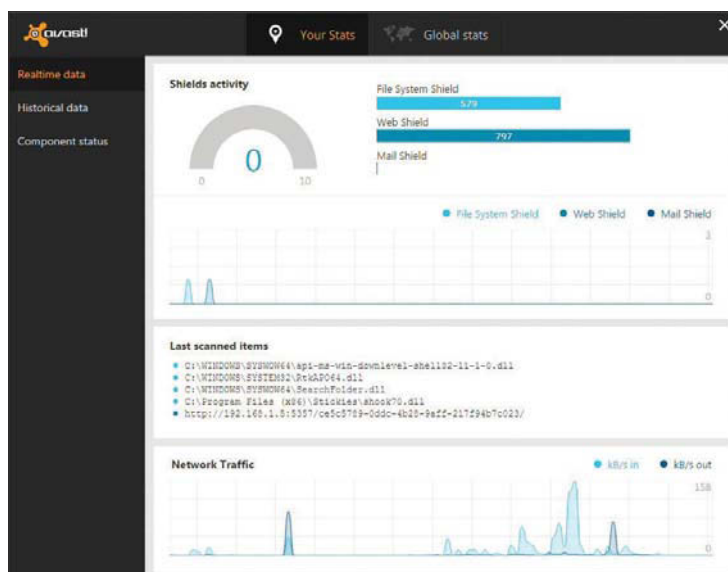
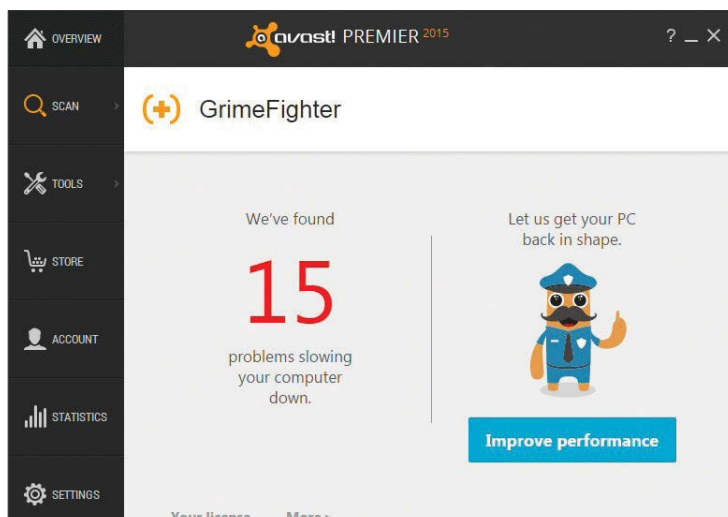
Avast is good at presenting security stats in non-technical terms. It's Home Network Security scan comes back and warns of any security weaknesses. We were surprised to find it was concerned about our 'weak' network password, though, which contains lower and upper case letters, numbers and punctuation characters. Hard to see how we could make it stronger.

You can also clean up your browser, by checking for malware add-ons and removing them automatically. Under test, Avast warned that the Webroot toolbar was a dubious add-on, though, which might say more about professional rivalry than the danger of the Webroot software.

The application checks the versions of the programs installed on your system and keeps them up to date. Avast's SafeZone isolates your browser for when you're banking online and Grimefighter, which is linked in under 'Scan for performance issues', though

you'll need to pay an extra £20 to fix what it finds.

Avast Premier 2015 completed our 50GB AV scan surprisingly quickly, in eight minutes 35 seconds, but only looked at 17,906 files. This gives a scan rate of 34.8 files/s, considerably slower than the 85.7 files/s average of all the IS suites we've tested. Rerunning the test, the software looked at the same number of



files, but did it in five minutes 31 seconds, somehow managing a 55 percent increase in speed.

In our copy test, copying a 1GB file took 16 seconds longer with a scan running than without, a 38 percent increase, which is a good deal better than average, but not good compared with the top players. This reflects AV-Test's results, where the comparison site gave it 3.5/6 in the Performance section of its tests. It took a second longer than the average in the organisation's group test.

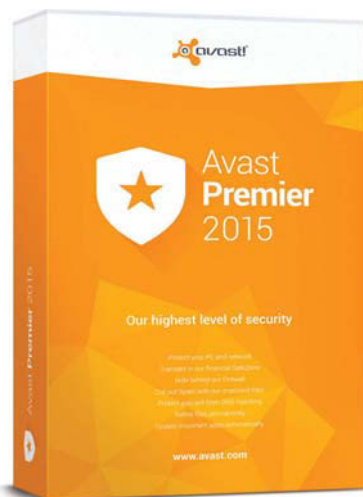
It did better in the Protection category, scoring 5/6 overall. This equates to an average of 99 percent accuracy in spotting widespread and prevalent malware, the group average, and unusually, slightly better at 99.5 percent against zero-day attacks. These figures were from

the free version of the software, but Avast uses the same AV engine throughout its product range.

In the third section, Usability, the software scored a full 6/6 with no false blockages when visiting websites and only two false detections during scanning of 425,612 files, against a group average of nine. Adding the scores for these three categories gives Avast its overall score of 15.5/18, which is a commendable result, though short of the market leaders.

Verdict

Avast is an excellent free AV offering. This commercial product is not such good value, lacking some of the features we've come to expect of premium suites. Backup and PC tune-up are missing or require an extra purchase. Simon Williams



£45 inc VAT**Contact**

■ eset.co.uk

SpecificationsAny Windows XP SP2/
Vista/7/8/8.1 system**INTERNET SECURITY SUITE****Eset NOD32 Antivirus**

Eset is a Slovakian company with offices in many countries and has been producing security software since 1992. NOD32 is the core of several Eset products, but NOD32 Antivirus is the simplest and cheapest of them.

Even so, it has a reasonable range of features, starting with antivirus and anti-spyware protection, but also including anti-phishing, a social media scanner, and exploit blocker. You have to look to Eset Smart Security for anti-spam, firewall, parental control or mobile protection and there's no backup or tune-up provision even in that package.

Eset NOD32 Antivirus has one of the best-looking interfaces of any AV product in our view, with a clean, no-nonsense approach. It has category headings down the left-hand side and icons and selection menus in the main part of the control window.

There are some useful extra features in the scanner, such as the ability to repeat the last scan processed and to specifically target removable media. The software logs scans and incidents and can display statistics on recent activities.

Ease of use: ★★★★★

Features: ★★★★★

Performance: ★★★★★

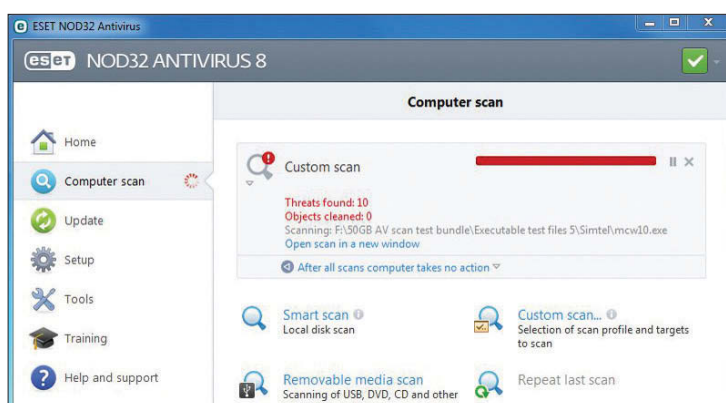
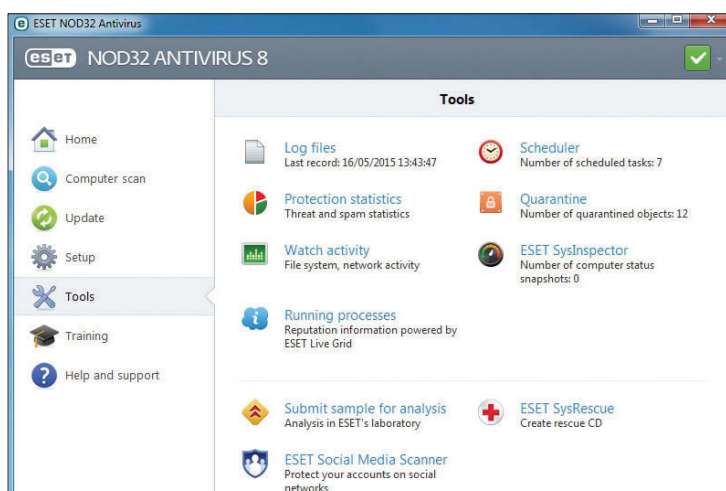
Value: ★★★★★

**Security stats**

On our test scans, which use 50GB of 'known clean' files to test the scan rates of the IS products we review, we were surprised to find Eset spotting suspect files, which other products didn't flag. This was because we had detection of 'potentially unwanted programs', or PUPs, turned on and software such as the Conduit search engine falls into the category. Since Conduit is such an awkward program to remove, it's surprising other IS suites don't flag it, too.

In our tests, Eset took just under 22 minutes to scan 50GB of assorted files, examining 135,420 of them to produce a scan rate of 103.8 files/s. This is a good throughput, above the average of the IS apps we have tested.

There are some useful extras in the scanner, such as the ability to repeat the last scan processed and to specifically target removable media



Even better, on rescanning the same basket, the software looked at only 9,553 files and took just 32 seconds to complete the task. This indicates a very high degree of fingerprinting, which avoids rechecking files that haven't changed since previous scans.

We also saw a low resource hit, when we timed 1GB file copies with and without a full scan running in the background. There was a 35 percent slowdown, against an average of 67 percent over all the products we've reviewed.

The German test site AV-Test didn't find quite the performance we saw, over its much wider set of tasks. It recorded a five-second slowdown, against a group average for its own group of four seconds. This earned it a score of 3.5/6, which isn't good in anyone's book.

However, in the Protection category, it scored a much better 5/6, with a 100 percent detection rate for established malware and 96 percent overall against zero-day attacks. In the second month of testing, it managed 98 percent detection, against an average of 94 percent.

Finally, it only clocked up three false detections, when the average in its group was nine. This earned it a full 6/6 in the Usability category of the suite. This gives it an overall score of 14.5/18, which is a worthwhile result, though not among the leaders in the field.

Verdict

Eset NOD32 Antivirus is a sound antivirus product with some useful extras, though it's a bit surprising anti-spam isn't included in the product. The software is easy to use and doesn't disrupt the normal function of the PC it's running on. Technically, it's a strong contender, without being in the front rank.

✉ Simon Williams

ULTRA-HD

Uniformly bristling with an Ultra-HD resolution of 3840x2160 pixels, 4K-class UHD monitors range from 24- to 32in screen size, and are priced from a budget £330 up to a premium £1,400. **Andrew Harrison** and **Paul Monckton** test six of the latest models

There are murmurings from the film industry of 4K movies and video as the next Big Thing in home entertainment. Finding actual 4K footage to enjoy in mid-2015 is still hard though – Netflix, Sony and Amazon have limited streaming-only offerings in some territories, but the roll-out is tentative at present, and you're limited to certain specific models of smart TV. Plus, of course, you'll need a reliable uninterrupted high-bandwidth internet connection to access these streams.

Viewing from a Blu-ray disc or downloading would be a much better proposition, but no studio is taking advantage of the latest 100GB BD discs nor releasing 4K films to download and keep – just yet. Hopefully 4K Blu-ray films will be available to buy by the end of 2015, as promised by the Blu-ray Disc Association at IFA 2014. But that doesn't mean we cannot enjoy the benefit of enhanced resolutions for use on a personal computer today. Until recently, 'full HD' – or 1920x1080 pixels – was the highest goal for high-resolution video and the screens on which to watch it. But the industry was shaken up by Apple when it introduced the idea of Retina displays to consumers – LCD matrices with pixels packed so tightly that the human eye cannot discern individual picture elements at normal viewing distances. At once panel makers rushed to go beyond traditional pixellated device displays.

It started with the iPhone 4, followed by other smartphones and tablets, and now we find laptops and desktop PCs, too – they can all be found with breathtakingly sharp displays, providing print-quality typography and razor-sharp images. The density of pixels required varies, depending on actual viewing distance, but for laptops and desktop PCs around 220 pixels per inch (ppi) is about right for real Ultra-HD mode.

With the help of UHD displays, you can get a decent approximation to that quality, especially if you find a small monitor still packing 3840x2160 pixels. Ideally, you'd

need a 20in monitor but in their absence a 24in design is the closest, providing 184ppi. Our group includes two examples of perhaps the most popular UHD size at the moment of 27in, plus 28-, 32- and a 40in whopper.

In Windows, you set the interface resolution to 150- or 200 percent to view these UHD displays with sensible size fonts and folders. The result is a very sharp desktop with jag-free fonts. But be warned that many Windows programs will not respect these settings and you may still need to arm yourself with a magnifying glass to read the screen. In Mac OS X Yosemite, the interface can be set to true Retina mode – also known as HiDPI mode – by selecting 'looks like 1920x1080' from the Mac's Display preferences. Mavericks users will need to use developer tools to access HiDPI mode. In fact, we found with some displays, the Mac automatically set Retina mode when attached.

Alternatively, you can keep the screen's native 2160p setting and 100 percent scaling from the PC, which works better with the largest 32- and 40in offerings. Be prepared to squint a little to see, but enjoy the acres of desktop real estate now available.

In a bid to keep the marketing simple, the four-times full-HD resolution that is exactly four times 1920x1080 is now typically labelled '4K', even though twice the pixel count on each axis creates only a 3840x2160-sized image. Somehow 3.8K doesn't have the same ring to it; but be aware there are literal 4K-class panels with 4096x2160 pixels, based on the Digital Cinema Initiative standard for cinemas with high-resolution digital projection.

What to look for

Don't be too distracted by trendy styling and outrageous specification boasts. A display is for looking at electronically created images, and demands an LCD panel of high quality first and foremost. The cheapest LCD tech is twisted nematic (TN), which generally provides poor quality images in every key

parameter. The human eye can be forgiving though, and viewed straight-on many users won't realise just how much colour and contrast their monitor is missing. Higher grade options are found with in-plane switching (IPS) and vertical alignment (VA) panels, which are available at much more approachable prices today, and all of the cutting-edge UHD monitors available today will take these superior panels.

Our eyes can judge image quality readily enough, but it helps to put figures on available performance. Brightness rating is a manufacturers' arms-race figure that can be safely ignored, so long as the result is above around 200 candela per square metre (cd/m²). Much more important is contrast ratio, the difference between the very brightest and darkest images a screen can show. Around 500:1 is the starting point for believable imaging, though, you should beware brands that promise the earth with millions:1 ratios, as they will be fudging their figures.

Colour gamut, the spectral spread of reproduced colour within our perceptual limits, has been getting worse in modern displays, tumbling first with the introduction of LCD to replace glass-tube CRT sets. Then colour gamut shrunk again when traditional CCFL backlights were tossed out in favour of white LED technology. Full coverage of the PC-standard gamut called sRGB is a good first target for decent colour range; Adobe RGB is a more challenging spec that nevertheless gets closer to the vast range of colour the human eye can appreciate.

Colour accuracy meanwhile is about reproducing the exact hue as intended, rather than a rough approximation. Deviation from true colour fidelity is represented by a Delta E figure, lower numbers better. Close to or below 1.0 is a good achievement.

A narrow bezel to frame the actual panel is usually welcome, and preferably not a distracting and shiny one. The panel should be supportable at a comfortable height, which means a fully adjustable stand that

MONITORS



Photography by Dominik Tomaszewski

can centre it precisely at your own eye level; bending the neck downward at all to view is a recipe for skeletal strain and stress after long-term use.

Today, to connect the monitor to a PC and appreciate 8.3Mp of colour (3840x2160 = 8,294,400) that is being refreshed 60 times per second (60Hz), the only viable option at the moment is a link via DisplayPort 1.2. You could try HDMI if you have a source device specified to v2.0, but this is in effect missing in action for most personal computers as of May 2015; and still also rare on today's displays. You can use HDMI 1.4, the previous specification, but will be limited to 30Hz refresh rate on UHD resolution displays, which makes motion look very strobed on the PC desktop.

Some monitors offer 'dual-link DVI', based on two DVI streams in one DVI

connector. DVI remains popular with gamers who believe that this digital interface cable has less latency and so will better their reaction times. However, we're now seeing DVI with added HDCP, a digital restrictions management system enforced by Hollywood to deter copying through the monitor cable, and this is likely to introduce additional processing time and hence introduce the lag for which HDMI got bad press. In addition, dual-link DVI is limited to 2560x1600 pixels at 60Hz, so is of little practical use on an UHD display.

Response time is often quoted in the manufacturer's specifications, another area for brand one-upmanship, but even for gamers there is little need to seek vanishingly low figures such as 1- or 2 millisecond (ms). The intrinsic lag of the monitor's electronics is typically well

in excess of 10ms, so the added time for liquid crystals to complete their transition as they turn on/off has become inconsequential. Response time figures are quoted solely for gamers' benefit, best filed under marketing misdirection.

Remember, you need a good graphics processor to push all those pixels in a timely fashion on to the screen. Integrated graphic chipsets in Intel Core series processors will sometimes do the job, the recent Haswell generation and onward anyway, although a suitable discrete AMD or nVidia graphics card may be preferred for best results.

Don't get too excited about UHD gaming yet though, as it demands the very best and most expensive of today's GPUs to drive these screens at native resolution with a decent framerate and detail level.



ACER S277HK

£500 inc VAT • acer.co.uk

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★☆☆

LCD panels for PCs are now bigger than ever, but that doesn't necessarily mean you have to have a big monitor on your desk to enjoy more screen working space. With the Acer S277HK, you get the expanse of a 27in monitor in a compact frame that's little bigger than most 24in designs.

This is a monitor that wants to wow with its unusual design, featuring a nearly bezel-less display and a fixed offset stand that's offset of central to hold the panel in the air.

Here is a desktop monitor which sets itself apart from the all-black school of display, instead using glossy white plastics across the back panel and a natural aluminium finish support stand. There is plastic trim running up the centre of the back and around the display's edge, sprayed in silver to match the stand finish. The brand name 'acer' is emblazoned across the back in lower case on an otherwise neatly finished part of the monitor that's too often overlooked by monitor manufacturers.

From the front there's little to see apart from the 3840x2160-pixel IPS panel and a chin piece that runs along the bottom; a veneer of aluminium trim with a brushed grain effect. Acer markets the monitor as frameless although it's not a true 'infinity' display that goes right to the edge - the visible display is framed by a black and silver border around 8mm wide along the top and side. Meanwhile, the bottom strip measures 25mm thick.

While the stand is minimal and stylish, we found it to be simply too low to be used comfortably. Placed on a desk, it will need lifting by a few books' height to bring it to a safe working height that doesn't cause neck strain from poor posture. Normally we'd suggest trying a third-party stand attached to the monitor's rear VESA mount, but this monitor doesn't have one.

The panel's provenance is unknown, but appears to be a gloss-finished type that has been treated to a stick-on anti-glare film. This does a great job of reducing annoying reflections, although it also adds a layer of grain to the image, making it more soft-focused than panels with a factory-applied hard coat anti-glare finish.

Connections are made to the panel above the stand mount point at the rear, with cables docking perpendicular to the panel. There's a choice of regular and Mini DisplayPort (both to v1.2 standard), DVI and HDMI. Most usefully, the latter is the latest v2.0 standard, so will allow native UHD resolution at full 60Hz refresh rate. That

could prove invaluable in future-proofing, for when HDMI 2.0 finally becomes commonplace on PCs.

The S277HK relies on four hidden buttons under the screen bezel for adjustment. These buttons are sunken into the frame and only just pressable after a concerted effort since they're so recessed.

The OSD that appears is fixed in the bottom right corner, and requires you to move your finger between different hidden buttons that lie under changing onscreen graphics. It's not the worst OSD setup menu we've seen, but did prove annoying to navigate.

Performance

The colour gamut of the Acer's IPS panel was wide enough to fully encompass the sRGB colour space, and with a reported 80 percent cover of the Adobe RGB space, it also measured by a fractional margin the widest colour spread in this group.

Contrast ratio was good when compared to budget displays, if a little low for an IPS technology screen and the poorest in this group test, showing a 530:1 ratio. Most high-quality IPS panels will be closer to 600:1 or 700:1.

Colour accuracy was very good, with an average Delta E figure of just 1.08. Brightness variation was average, the top third of the screen darker by around 15 percent, increasing to 25 percent darker than the bottom at a nominal '25' brightness setting. In use this is still not a major issue.

Sound quality from the built-in stereo speakers was passable for system alerts but tinny and annoying for music. Don't be fooled by the DTS brand badge in the marketing - this is no hallmark of audio quality any more, and in this example switching the DTS function on served no audible purpose whatsoever.

With a peak draw of 53W at full brightness (280cd/m²), the Acer is a little higher than others of its size and resolution. Down at a more usable 120cd/m² it drew 29W of power.

VERDICT: The Acer S277HK makes an impact with its angular white and silver design, and offers good image quality that's only clouded a little by the applied anti-reflective film. An adjustable height stand or even VESA mount would subtract our problems with its form-before-function ergonomics. At around £500, it is one of the cheaper 27in UHD IPS displays currently available.



AOC U2868PQU

£330 inc VAT • aoc-europe.com/en

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

Most of the UHD monitors now available are still in the premium category, featuring high-quality IPS panels and prices at £500 and above. But if you're looking to snare an ultra-high-resolution display and don't think they're worth that much, there's now the option for budget construction monitors packing nearly 4k across. The U2868PQU is just such a unit, offering 3840x2160 pixels and a price closer to £300. So what's the catch?

It makes economies principally through taking a lower-grade twisted-nematic (TN) panel. This typically means more restricted viewing angles, poorer colour accuracy, and lower contrast ratio; however TN can have the advantage of lower power consumption and faster refresh rates. As it turned out, the AOC dispelled most of these trends in surprising ways.

Rather than go for glitz, the U2868PQU is a simply styled monitor, with matt black plastics all around and no visual ornamentations. The display bezel is reasonably narrow at 18mm on the top and sides, if rather chunky along the bottom at 35mm.

The monitor includes a height adjustable pillar stand, 60- to 180mm from desk to screen bottom, with tilt, swivel and 90-degree portrait mode all available. You can also use a VESA 100mm mount.

Connections to a PC are made through down-pointing ports along the back box, and a four-port USB hub sits on its right side. Only two of the latter ports are USB 3.0, a small clue of the cost-cutting specification by sneaking in USB 2.0 here. Video connections include DVI, DisplayPort, HDMI and VGA. While the first two should allow full 60Hz refresh rate at native resolution, the HDMI is at v1.4 and limited to 30Hz operation. The DVI input is also listed as DHCP-compliant, meaning its laden with DRM processing technology, so may not be the straight passthrough that gamers seek.

And AOC bills the display as one for gamers, advertising a grey-to-grey pixel response time of 1ms. While impressive looking, the company does not comment on the more relevant overall input lag, which is likely to dwarf this 1ms time by one or nearly two orders of magnitude. It's also described as a flicker-free design, and in our tests we were not able to discern any sign of high-frequency PWM switching, even at lowest brightness settings.

Overall build quality is perfunctory but acceptable, with a case and stand that feel somewhat budget but up to the job of supporting the panel in front of you.

To set up and control the U2868PQU there is a row of four touch-sensitive 'buttons' in the right of the chunky lower screen bezel. Like the ViewSonic VP2780-4K (page 85), these are tricky to operate and feel cheap in use. Sometimes they work on first press, while at other times we had to make a concerted effort by gripping the whole bezel between thumb and finger and squeezing.

Performance

The AOC has better than expected off-axis viewing. It doesn't compare to IPS, especially for below-axis image which quickly deteriorated into black fudge just a few degrees below the normal; but you can at least move to 45 degrees left and right, and still have a discernible image.

Contrast ratio measurement peaked at 610:1 at full brightness, and at a more usable half-brightness level of 167cd/m² it was still providing 580:1. Colour gamut was quite extended for the panel type - we measured 97 percent of sRGB and 76 percent Adobe RGB. On paper that's almost as good as the more expensive IPS types. Colour accuracy is one casualty of the budget technology though, with an average Delta E figure of 4.6 recorded, when better displays only rise to a Delta E of around 1.0.

Out of the box, the display quality looked overly bright and very washed out, though, this can be tweaked a little with the help of a screen calibrator. We also saw some faint vertical streaking down the panel, just visible with the display set to a grey test. There was, however, no obvious issue with light bleed from the screen edges.

Power consumption was one of the lowest at maximum brightness, drawing 59W at the peak brightness we could reach of 230cd/m². But at more realistic brightness settings, for which we standardise our test at 120cd/m², the AOC had one of the worst power consumption figures on test at 46W. This was only beaten by the 51W draw of the Philips at the same setting, although this is a huge 40in panel using more accurate VA panel technology.

VERDICT: The AOC offers a glimpse of UHD possibilities at around half the price of the competition. In its favour, it has a decent colour gamut and contrast ratio. On the down side, it's more costly to run, has poorer colour accuracy, and we felt even after adjustment that image quality was behind that found on IPS screens.



BENQ BL3201PT

£690 inc VAT • benq.co.uk

PC ADVISOR
BEST BUY

Build	★★★★★
Features	★★★★★
Performance	★★★★★
Value	★★★★★
Overall	★★★★★

Following BenQ's previous monster 32in monitor, the BL3200, the new BL3201PT gains a notable upgrade that moves resolution from 2560x1440 pixels, to the UHD dimensions of 3840x2160. This large desktop monitor is aimed at designers and discerning home users looking for great image quality, high-class construction, and notable ease of use. We think it wins on each count.

Based on a very large panel - even by recent PC monitor standards - stretching 32in across on the diagonal, the BL3201PT is no shrinking desktop violet. This IPS panel is framed by a relatively thin bezel around its 16:9 form, in professional matt black rather than showy and distracting gloss plastics.

The detachable stand has a heavy rectangular base platform that provides solid support, able to rotate, tilt back and forth, and crucially is height adjustable over a large range, between 60- and 210mm, providing a useful tall extension. When raised to its highest point, it can easily be swivelled 90 degrees into portrait mode.

At the bottom of the main pillar is a recessed dish to store a wired remote control. This palm-sized widget includes four buttons around its circular top, labelled 1, 2, 3 and Back, with a four-pole compass rose inside this and an OK button in the centre.

Connections to a PC are made along the right side of a panel box that protrudes from the rear, with a choice of DVI, two HDMI, and full-size and Mini DisplayPort 1.2. The HDMI inputs are only specified to v1.4, which limits screen refresh rate to a 30Hz maximum at native screen resolution. This unfortunately limits other sources with HDMI 2.0 ports from taking advantage of the monitor's capabilities.

On the very edge of the screen frame on the right side again are some additional ports closer to hand that may be required more frequently - an SD card slot, two USB 3.0 ports and a headphone jack. There's another three USB 3.0 ports facing downward too, all available through a shared hub once wired to your PC with one USB 3.0 Type B cable.

Stereo speakers are built in, a pair of tiny 18 mm on each side and facing upward through the monitor's cooling grates. Sound quality is not the worst we've heard, but the thin, papery sound with additional rattle is too grating to enjoy music or video soundtracks.

The BenQ has the best OSD interface we've seen on a UHD display, starting with five touch-sensitive white LEDs that are concealed on the right of the lower bezel edge. As your finger nears, a proximity

sensor turns on the lights; and when you press one a small graphic panel appears onscreen to give direct access to input, volume, main menu - plus Picture Mode, where you can quickly change presets such as CAD/CAM, Low Blue Light and sRGB mode.

The wired remote is even quicker to use, and has the benefit of a gentle mechanical click that gives more intuitive feedback when any button is pressed. Using the remote alone, you can very simply move through the entire menu to tweak any setting; or take advantage of the user-programmable three preset buttons.

Performance

The BL3201PT comfortably meets the sRGB colour space, and the chromaticity diagram shows its coverage extends fractionally further into the green-red vertices. We also measured 78 percent Adobe RGB coverage, a decent figure which is now typical for high-quality IPS panels, if short of what was once available before white LED backlighting became the norm when closer to 100 percent Adobe RGB was more common.

Contrast ratio measured well at 650:1, which is about average for a better-grade IPS panel. And judged by eye we saw good, dark blacks in typography and image details.

Luminance uniformity across the panel was excellent, with no greater variation than 17 percent at full brightness and peak 20 percent in one corner at the more slightly revealing 50 percent brightness setting (which here was a very low 44cd/m², too).

Colour accuracy was superb, one of the best on test, with an average below 1.0, resulting in Delta E of 0.95. This was only beaten by the much more expensive Samsung.

Peak power consumption was around 50W, here giving an insanely bright 362cd/m², and when dialled back to a more realistic 120cd/m² we saw only 27W drawn, one of the lowest figures and remarkable given the size and resolution of the panel.

VERDICT: The BenQ BL3201PT is an outstanding monitor that ticks almost every box as a modern high-performance UHD display. By combining the basics of uncluttered and well-constructed design, and an OSD interface that doesn't make you want to punch the screen, the display becomes far easier to live with, all sealed by the best overall image quality at the price.



PHILIPS BDM4065UC

£600 inc VAT • philips.co.uk

PC ADVISOR
RECOMMENDED

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

At 40 inches on the screen diagonal, the Philips BDM4065UC is the largest panel we've ever seen that's sold as a PC monitor – displays of this size are more commonly labelled a television. But the Philips is a dumb display with no TV tuner, and instead offers simple direct video inputs from the usual roster of DisplayPort, HDMI and even VGA D-Sub ports.

The design follows that of many modern televisions with a vanishingly small bezel around the panel, gloss black and just 12mm thick on all edges. This means the image on the screen dominates rather than any added styling of the cabinet, with just a small angled chin in the lower centre of the frame that shows the Philips name badge. A tiny white LED glows when the screen is on, and flashes on and off when in standby mode.

A low metal stand is included that raises the panel just 75mm from the desk, but with no scope for height adjustment, rotation or even backward tilt. Fortunately a heavy-duty 200mm VESA mount can be screwed to the back to customise its siting if you should want to use the display as a PC monitor with more ergonomic positioning. Given its huge size though, we can also see the BDM4065UC being used as television or film screen in PC-based home-cinema systems. Or given how many people now rely on satellite or cable to watch all their TV, it could live in the lounge with the help of just a set-top box.

Inputs are ranged on the left down the side of a protruding panel box on the back, providing a choice of one each of regular and Mini DisplayPort, two HDMI and VGA inputs. Both DisplayPort inputs are to v1.2 specification, while the HDMI options comprise standard and MHL versions, both full size and specified to v2.0 for optimum 60Hz refresh rate at full native 3840x2160-pixel resolution.

The panel itself is unusual among other PC monitors. It's based on vertical alignment (VA) technology that's more typically found in televisions. It offers excellent contrast through good reproduction of deep blacks, and a decent colour gamut that outstrips that of most TN panels. There is a semi-gloss finish to the panel, which means it's part mirror and therefore won't be suited to those that find it difficult to work in front of their own reflection.

To set up and adjust the BDM4065UC there is a single four-axis thumbstick, found by reaching under the right bottom corner. Nudging this to the right (as viewed from the front) brings up the onscreen menu; downwards to quickly change inputs; to the left to

change SmartImage mode from various presets; and upwards for assorted picture-in-picture modes. You can set picture-by-picture too, for four full-HD feeds into the display, one in each corner.

Performance

In terms of colour gamut, the VA panel proved able to nearly cover the sRGB colour space, just slipping a little in the blue corner of the chromaticity chart, but extending further than required in the green/yellow corner. As well as 99 percent sRGB, it also measured with 75 percent Adobe RGB, in line with the IPS monitors in this group.

Where the VA panel really excels, both in measured results and simple subjective evaluation, is in its outstanding contrast ratio. This means you can expect stellar whites and inky blacks, creating a lifelike picture that's closer to reality.

But with black level figures that tend to stay extremely close to zero, it's difficult to get accurate and meaningful ratio figures. However, we measured more than 12,000:1 contrast ratio at 100 and 75 percent nominal brightness, and 70,000:1 at a 50 percent setting.

Maximum brightness is a little down on other monitors, but the 257cd/m² peak output recorded in the contrast-ratio test will be fine for all but the most over lit of indoor rooms.

Colour accuracy was also fine, with an average Delta E of 1.5. Where the BDM4065UC did fall down though was in its inconsistency in brightness levels across its large panel.

As measured by the colorimeter, at full brightness luminance varied up to 35 percent, the four corners showing obvious darkening to the eye. At nominal 67 percent brightness setting, we measured the four corners at 18-, 24-, 26- and 38 percent darker than the reference quadrant on the panel's left middle. And at the 50 percent brightness setting, the corners were up to 39 percent darker.

Power consumption was a relatively high 74W at full brightness, falling slightly to 51W at the standard 120cd/m² level. This is higher than other monitors on test, but given the huge panel size it is not a significant increase in power draw.

VERDICT: The Philips is a great display for anyone that needs a very large desktop monitor, or perhaps to serve as a screen in a PC home-cinema system. It has outstanding contrast ratio and good colour accuracy, a winner in almost every way.



SAMSUNG LU32D97KQSR

£1,400 inc VAT • samsung.com/uk

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

Ultra-HD monitors are a boon to creative professionals and well-heeled enthusiasts, and this 32in model from Samsung is one of the highest-quality displays we've ever tested.

Featuring a 3840x2160-pixel resolution, the LU32D97KQSR, also known as the UD970 or U32D970, offers the equivalent of four full-HD monitors rolled into one, allowing you to scrutinise your images in the finest detail, but this display is about much more than resolution. Covering 100 percent of the Adobe RGB colour gamut, the UD970 is capable of displaying a massive range of colours; going far beyond what standard monitors can reveal and matching the capabilities of professional digital cameras.

The UD970 avoids the bulky, and ugly, look of many professional grade monitors, featuring instead a subtle two-tone metallic grey finish with gentle, sweeping curves. There's plenty of plastic on show, it's no iMac, but the overall finish is rather harmonious for a display of this size which could otherwise look rather imposing.

The panel comes in a matt finish and is fitted to a fully height-adjustable stand which also swivels and pivots into landscape format. Inputs include 1x dual-link DVI, 1x HDMI 1.4 and 2x DisplayPort. You also get a headphone socket and a four-port USB 3.0 hub. The display is capable of displaying the full 4K resolution at 60Hz using DisplayPort 1.2 Single-Stream Transport (SST) mode.

Users of Intel Integrated graphics should be warned that the 4K/60Hz resolution doesn't work in Multi-Stream Transport (MST) mode on the UD970, so Intel's Collage Mode cannot be used. This limits 4K operation to 30Hz on Integrated graphics solutions found in Haswell and older processors.

A row of seven control switches lines the bottom right of the display, operating an onscreen menu system, which is both clear and easy to use, despite the complexity of its many functions.

The panel itself features Samsung's Super PLS (Plane-to-Line Switching) technology, which delivers IPS-like performance including wide '178 degree' viewing angles horizontally and vertically. It also delivers excellent colour reproduction and, in this regard, the performance of the UD970 is nothing short of phenomenal.

The monitor is capable of storing custom calibration data internally and the UD970 ships with a printed calibration report in the box demonstrating that each particular model falls within Samsung's stringent specifications.

Performance

It's no surprise then, that our own measurement tests reveal the best colour accuracy results we've ever tested. The worst error reported is a Delta E of only 1.57, with an overall average of just 0.57 Delta E. But, it gets even better than that. We ran Samsung's own Natural Color Expert software in conjunction with our Datacolor Spyder4 Elite calibrator before re-running our tests. The colour accuracy results improved to a maximum delta E of 0.91 and an average delta E of 0.38. A Delta E of 1.0 is defined as a 'just noticeable difference', so the UD970 is in essence perfectly accurate after calibration.

It's a similar situation with screen uniformity. Poor monitors can vary considerably in colour and brightness response across the surface of the screen. Variations in brightness of up to 20 percent are not uncommon on consumer displays, even on decent models. The Samsung on the other hand never exceeded 6 percent brightness variation and generally kept the colour uniformity error in the region of around 1.0 Delta E, the worst example being a Delta E of 2.9.

One problem with wide-gamut displays is that, unless you're working in a properly colour-managed environment, colours can look oversaturated. The UD970, however, can masquerade as a standard sRGB display or any of a wide selection of other standards via the built-in menu or under the control of Natural Color Expert.

If the UD970 has an Achilles heel, it's in the area of contrast. The monitor can display delicious-looking images, but switch to watching movies and you'll notice it doesn't deliver the punchy deep blacks of a decent TV. We measured a maximum contrast ratio of 490:1, which falls well behind many much less expensive displays and is the worst contrast score in this group test.

That said, gaming on this display is in no-way disappointing. In fact it's very exciting and immersive, but you'd be channelling a considerable amount of money into features you don't need if this is your main reason for buying a UHD display.

VERDICT: The UD970 is a pricey display that never feels too expensive for the phenomenal image quality it delivers. Its 4K UHD resolution, combined with accurate colour rendition and flexible display modes make it an excellent choice for graphic artists. However, if you're after a gaming or multimedia display, you'd be better off saving some money and going for something with better contrast.



VIEWSONIC VP2780-4K

£699 inc VAT • viewsoniceurope.com/uk

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

The VP2780-4K joins ViewSonic's range of displays aimed at budget-conscious professionals that need a PC monitor a step above the usual consumer fare. This 27in display is well specified with an IPS technology panel, matt anti-glare hard coating and 3840x2160-pixel resolution. This panel is from LG, an 8-bit type with framerate control (FRC) to synthesise 10-bit colour through dithering. ViewSonic does specify a 14-bit look-up table (LUT) and colour processing.

The monitor has a simple and sober frame made from matt black plastic, with a reasonably narrow 22mm bezel surrounding the LCD panel. The sturdy tripod stand is fully adjustable for height, tilt and swivel; and also allows the screen to be rotated 90 degrees for use in portrait mode. Overall build quality is good, if short of true professional standards. The cap that covers the top of the stand pillar is held on with just a dab of adhesive, for example, and liable to fall off with heavy handling; and the use of an external laptop-style power supply is more in line with cheaper consumer monitors, too.

To reduced eye strain, the ViewSonic offers flicker-free brightness control, regulating the panel DC voltage rather than through rapid on/off PWM switching as we find on the cheapest consumer displays. An optional blue-light filter may lend a slightly yellow cast to the image, but it should reduce the amount of short wavelength blue light that is now believed to be unhealthy in prolonged use.

There is a useful selection of up-to-date connectivity for this ViewSonic, starting with two DisplayPort inputs (one of which is the Mini type devised by Apple) and both follow the v1.2 specification. This means that resolutions up to 3840x2160 pixels at 60Hz are possible. In addition, the VP2780-4K is one of the first wave of PC monitors to support HDMI 2.0, which likewise enables 60Hz refresh rates at UHD and 4K resolutions. There is one regular HDMI 2.0 port, and two designated MHL and using the standard full-size HDMI port.

No speakers are included, although there is a 3.5mm audio socket for headphones, with digital audio piped in through either of the digital video connectors. For desktop peripheral connection, four USB 3.0 ports are available, two on the back and two on the right side.

The control interface follows that of other VP-series ViewSonic monitors, with five touch-sensitive areas on the lower-right edge of the bottom bezel. The first two are labelled 1 and 2; the second pair are down- and upward-pointing triangles; the last is a standby power control. To access the onscreen menus, press 1 to call up the menu,

then use 2 like an 'OK' button. To go back a level you use 1 again, while the up/down touch buttons allow navigation through menus.

It's not as intuitive as professional monitors we've seen from BenQ, for instance, but the system works reasonably well after some familiarisation. However, we still find touch sensitivity an issue - the button areas do not always respond unless you press firmly, which requires you to support the display with the other hand or pinch the entire frame between thumb and finger; and pressing and holding to accelerate through brightness settings, for example, can be fitful. The all-capital and low-resolution typography used throughout the screen controls has erratic font tracking, lending it the style of a cheap Chinese consumer product.

Performance

ViewSonic explains that each VP2780-4K is individually calibrated in the factory for correct colour, with a guarantee of Delta E2. The monitor is specified to provide 100 percent sRGB and 80 percent AdobeRGB coverage. Additionally, the company offers a zero dead-pixel warranty for the duration of the three-year warranty.

In our tests with a Datacolor Spyder4 colorimeter, we initially measured 89 percent sRGB colour gamut, and 68 percent AdobeRGB. This is well below the 100 percent sRGB specification, and after consulting with ViewSonic we discovered that the full gamut is only available by setting the colour mode to User rather than Standard. Contrast ratio measured by the chequerboard test was 690:1, while Delta E averaged 1.12. Judged subjectively we found the image quality to be excellent, with clean text and no obvious colour gradients.

Power consumption was very low considering the panel technology and high resolution. We saw 39W consumption at the screen's full brightness (a high 432cd/m²), falling to a very economical 19W when calibrated to 120cd/m².

VERDICT: The ViewSonic VP2780-4K is expensive for a consumer monitor at £699, although relatively cheap when set against professional monitors with full Adobe RGB colour and polished OSD menus, for which you can expect to pay closer to twice the price. The warranty is useful with its zero dead-pixel warranty, making the VP2780-4K an accessible UHD monitor with 100 percent sRGB for professionals on a tighter budget.

Conclusion

While most of the screens here clustered around £600, you can find cheaper UHD displays if you're prepared to sacrifice build and image quality. That's what we found with the AOC U2868PQU, a TN-based design with basic build and mediocre image quality. Its lab measurements were in some way more impressive than subjective quality, with near coverage of the basic sRGB colour gamut and decent-looking contrast ratio figures that bettered the Samsung. But while viewing angles were not as restricted as normal for the type, if you're used to an IPS screen - through using smartphones and tablets - it's hard to reconcile with a display that changes its colours or fugs the entire image, just because you view it from elsewhere other than head-on.

From the ridiculously cheap to the sublime - Samsung's UD970 can be seen as a statement in what can be done with enough budget, and the will to make a screen with record-breaking colour accuracy reports. It measured very well in all respects but one, falling over in contrast ratio results which were shamed by a budget TN panel. But the Samsung excels in applications that demand true accuracy. It's not going to replace your telly, it's not cheap but it does represent a milestone in colour fidelity for UHD displays.

The Acer S277HK is a stylish display for the home or trendy office. Yet it nevertheless showed truly impressive image quality, with wide colour gamut and terrific colour accuracy. It's also the cheapest 27in UHD monitor we've tested still using IPS

technology. A lack of options about support leaves us reserved though, as the built-in stand is too low for comfort and there's zero opportunity to replace it with a third-party stand on a VESA mount.

ViewSonic is doing its level best to project professional values on to its VP2780-4K, including a printed calibration report. But there's no escaping this is more a high-end prosumer display than true professional screen. The cheap-looking OSD and erratic touch-sensitive buttons were incredibly annoying. In its favour, the ViewSonic is specified with HDMI 2.0 ports, has excellent sRGB gamut, contrast ratio and colour accuracy, and will be economical to run thanks to the lowest power consumption we've measured for its category.

	ACER £500 inc VAT (£416 ex VAT) 	AOC £330 inc VAT (£275 ex VAT) 	BENQ £690 inc VAT (£575 ex VAT)  PC ADVISOR BEST BUY
Product name	S277HK	U2868PQU	BL3201PT
Screen size	27in	28in	32in
Panel technology	IPS	TN	IPS
Pixel resolution	3840x2160	3840x2160	3840x2160
Pixel density (ppi)	163ppi	157ppi	138ppi
Panel make and model	Unknown	Unknown	Unknown
Panel bit depth	8-bit	8-bit with FRC	8-bit
Screen finish	Matt anti-glare film	Matt anti-glare film	Matt anti-glare film
DisplayPort	1x Mini DisplayPort 1.2, 1x DisplayPort 1.2	1x DisplayPort 1.2	1x Mini DisplayPort 1.2
HDMI	1x HDMI 2.0	1x HDMI 1.4	2x HDMI 1.4
Other input	1x DVI-D (dual-link)	1x DVI (dual-link), 1x VGA D-Sub	1x DVI-D (dual-link)
Speakers	Stereo	Stereo with 3W amplifier	Stereo with 5W amplifier
OSD buttons	Four press buttons under screen bezel	Touch-sensitive	Touch-sensitive on bezel, backlit
USB ports	4x USB 3.0	2x USB 3.0, 2x USB 2.0	5x USB 3.0 (plus SD card slot)
Stand	Fixed with tilt	Full height adjustable with portrait mode	Full height adjustable with portrait mode
Bezel width	8mm top, 8.5mm sides, 25mm bottom	18mm top and side, 35mm bottom	15mm top and side, 22mm bottom
VESA	None	VESA 100mm	VESA 100mm
Power supply	External, 90W supply with IEC C5 inlet	Internal, IEC C5 inlet	Internal, IEC C13 inlet
Dimensions	614x406x113mm	659x396x50mm	436x740x66mm
Weight (no stand)	4.9kg	Not listed	Not listed
Colour gamut sRGB	100%	97%	100%
Colour gamut Adobe	80%	76%	78%
Contrast ratio	530:1	610:1	650:1
POWER CONSUMPTION			
Max	53W (280cd/m ²)	59W (230cd/m ²)	50W (362cd/m ²)
120cd/m ²	29W	46W	27W

The 40in Philips BDM4065UC is a surprisingly good display, if not without some potentially deal-breaking faults. Faults first: even the second sample showed some patchiness in its lighting, such that screen corners looked a little vignetted, while the finish on single-colour wallpaper remained faintly mottled. Additionally, high-frequency on/off switching for brightness adjustment may be visible by some users. You're also limited to its two DisplayPort inputs, since maker TP Vision also scrimped with obsolescent HDMI 1.4 ports.

Get passed these issues if you can, and you will find a large panel well placed for entertainment use in the home, benefitting from a staggering contrast ratio and good colour accuracy, especially after some tweaking. It's not as finely detail on typography as IPS panels and the semi-gloss panel finish can distract with reflections in

daylight rooms; but for big-screen films and gaming without all the ephemeral rubbish currently being fitted to 'smart' TVs, the Philips is a strong contender.

If you're looking for a superbly built high-performance UHD monitor with the minimum of annoyances and fuss, you can't go wrong with the BenQ BL3201PT. It has a flicker-free backlight to illuminate its 32 inches of UHD panel, and it returned impressive lab results for image quality, if limited in colour gamut to sRGB rather than full Adobe RGB, like most current white LED-powered displays. It looks to be the pro-quality monitor that ViewSonic is trying to emulate in the VP2780-4K, but this 32in display beats it in each key parameter, with the exception of its HDMI spec which is clipped at v1.4 and thereby only 30Hz refresh. If you can live with its single input to use the display properly, it's a clear winner.

How we test

We subject every monitor to a basic evaluation of its brightness, contrast ratio, colour accuracy and panel luminance evenness, using a Datacolor Spyder4 Elite colorimeter to measure key specifications. As important are the subjective hands-on tests of ease of use through the on-screen display (OSD) and associated buttons. We assess build quality, examining materials used and the quality of assembly. As an indication to the cost of ownership we test power consumption of the monitor, measured at worst-case setting of maximum screen brightness (albeit without the operation of speakers and built-in USB ports), as well as a more real-world setting of 120cd/m², which gives a comfortable brightness level in a dimmed indoor environment. ☒

PHILIPS £600 inc VAT (£500 ex VAT) ★★★★★ PC ADVISOR RECOMMENDED	SAMSUNG £1,400 inc VAT (£1,166 ex VAT) ★★★★★	VIEWSONIC £699 inc VAT (£583 ex VAT) ★★★★★
BDM4065UC	LU32D97KQSR	VP2780-4K
40in	31.5in	27in
VA	PLS	IPS
3840x2160	3840x2160	3840x2160
110ppi	140ppi	163ppi
TP Vision TPT400LA-K1QS1.N Rev: SC1A	Samsung	LG LM270WR2-SPA1
8-bit	10-bit	8-bit with FRC
Semi-gloss	Matt anti-glare film	Matt anti-glare film
1x DisplayPort 1.2, 1x Mini DisplayPort 1.2	2x DisplayPort 1.2	1x DisplayPort 1.2, 1x Mini DisplayPort 1.2
1x HDMI 1.4, 1x MHL-HDMI	1x HDMI 1.4	1x HDMI 2.0, 2x MHL 2.0
VGA D-Sub	1x DVI-D (dual-link)	None
Stereo with 7W amplifier	None	None
Single joystick	Five press buttons under screen bezel	Touch-sensitive
4x USB 3.0	4x USB 3.0	4x USB 3.0
Fixed	Full height adjustable with portrait mode	Full height adjustable with portrait mode
12mm	Not measured	22mm
VESA 200mm	VESA 100mm	VESA 100mm
Internal, IEC C13 inlet	Internal, IEC C13 inlet	External, 80W supply with IEC C5 inlet
904x512x88mm	728x427x62mm	643x382x56mm
8.5kg	10.3kg	5.4kg
99%	100%	100%
75%	100%	79%
12,570:1	490:1	690:1
74W (218cd/m ²)	90W typical (not measured)	39W (432cd/m ²)
51W	Not measured	19W

BLOATWARE: HOW, WHY AND GOODBYE

Here's why PC makers intentionally make your PC experience worse, and how to clean up the mess. **By Brad Chacos**

Bloatware, crapware: no matter what you call it, the junk that PC makers dump on to new computers is nothing short of a mess. The situation was highlighted recently when it was revealed that some of Lenovo's PCs came preloaded with 'Superfish' adware, which actively left users vulnerable to attack. The software compromised secure HTTPS web connections in a quest to inject ads on the sites you visit... and make Lenovo a few pounds.

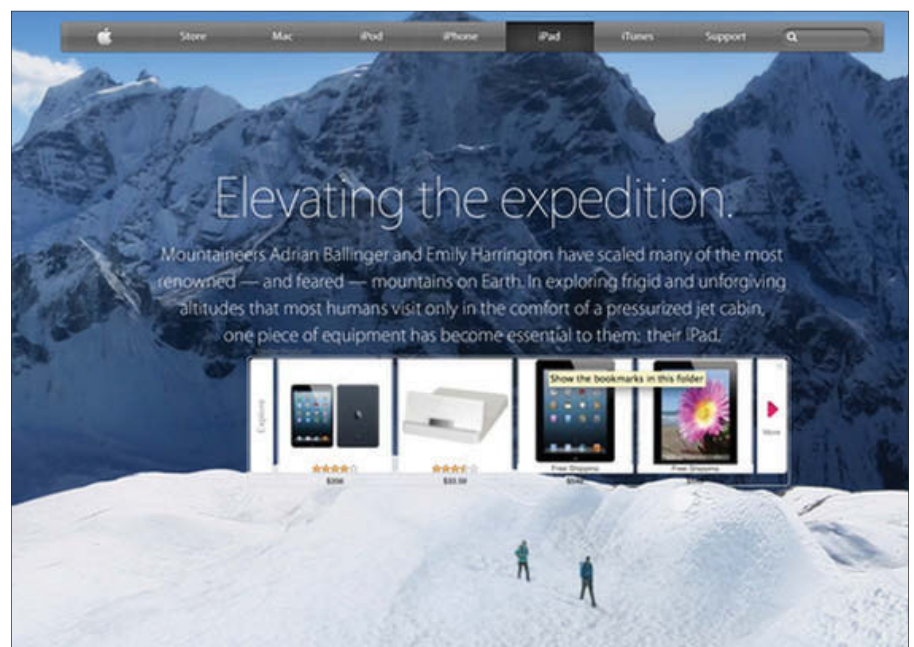
There's no doubt about it. Even though the root vulnerability came from Superfish, Lenovo messed up. This shouldn't have happened, full stop. But Lenovo didn't toss its users to the wolves out of malice - instead, the Superfish debacle is a natural extension of the entire bloatware epidemic.

Every penny counts

Bloatware exists because money's tight, and even the cheapest PCs are a substantial investment. On the plus side, prices are plummeting in the wake of cheap Chromebooks and Microsoft's

resulting counterattack. The NPD group says that the average selling price of Windows computers fluctuated between just £250

SUPERFISH injected ads in action on the Apple website





and £300 in October 2014 - 10 percent lower than prices a year earlier, and a new low watermark for PCs.

While that sounds good on paper, deep down it's troubling news for the PC industry. Mainstream personal computers are a cut-throat business; prices have been racing to the bottom for years now. Vendors make little to no money on such slim margins, which is a core part of the reason HP is splitting off its PC division (again), Dell took itself private, and Sony and Samsung have bowed out of the computer industry to varying degrees. There's no real money to be made on dirt-cheap hardware. That's where bloatware comes in.

PC makers don't believe that short-lived antivirus trialware is the best security solution for you, that adding browser toolbars will make your life easier, or that a 'visual discovery tool' such as Superfish truly adds to the user experience. Bloatware developers pay hardware makers cold, hard cash to pump your PC full of this rubbish and get in front of your eyeballs. That extra revenue often makes all the

difference for vendors between taking a bath on competitively-priced PCs, or eking out a small profit. (There's a reason pricier premium laptops often contain far less bloatware than budget PCs.)

It's a symbiotic relationship for bloatware developers, PC makers, and everyday users. In effect, bloatware subsidises PC prices. If it didn't, you'd pay more - perhaps much more - for your computer.

Beat it, bloatware

Even ignoring Superfish's security implications, the sea of junk consuming your PC's precious hardware resources can significantly slow down boot times.

The easiest way to deal with bloatware is to sidestep it completely. Microsoft, which

obviously wants to present Windows in the best possible light, offers bloatware-free 'Signature Edition' versions of many popular PCs, from the HP Stream 13 to the jaw-dropping Dell XPS 13, and even more expensive models. Even better, Microsoft charges little or no premium for these clean computers.

Microsoft puts its money where its mouth is, too. The company's Surface laptop-like tablets are similarly bloatware-free.

The Signature Edition line-up focuses on notebook and all-in-ones, though. If you want a proper bloatware-free desktop computer with a bit more firepower, you'll need to build your own machine and install Windows yourself. While this may sound daunting, it's not as difficult as you may think.

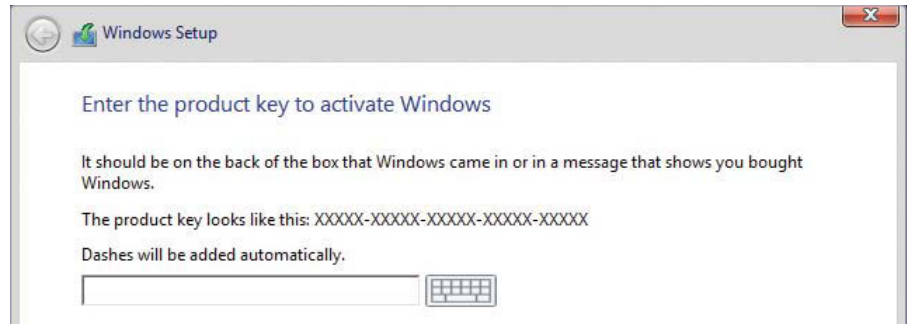
The developers of bloatware pay hardware makers cold, hard cash to pump your PC full of this rubbish and get in front of your eyeballs

Alternatively, boutique system builders such as Chillblast can build you a custom rig with nary a whiff of shovelware installed. Their computers tend to be a bit pricier and focused on gaming or business-ready workstations, however.

Cleaning up the mess

All's not lost if you buy a standard bloatware-filled PC, though. Wiping this off your system is straightforward, assuming it doesn't sneak in deeper, more dangerous hooks like Superfish did. (Lenovo's Superfish appears to be a unique situation, though – at least for preloaded bloatware.)

Deleting bloatware in the form of Windows Store apps couldn't be easier: simply right-click on its Tile, then select Uninstall. Likewise, sifting through the



also providing recommendations about whether to remove specific programs.

Remember to reactivate Windows Defender or install some security software if you remove trialware antivirus from your computer. You don't want to head into the wilds of the web unprotected.

The installation media for WINDOWS 8 is free, but you'll still need a valid product key to install it

bloatware into their system images, meaning that if you reinstall Windows with the provided tools, you'll also be reinstalling the preloaded bloatware.

To perform a truly clean install, you'll need fresh Windows installation media and the product key for your PC's Windows license. You may need to download some hardware drivers again when you're done.

Once you've finished, you should be staring at a new PC with a cleanly installed OS. What now? It's time to start filling it with more useful software, of course. Just be sure to mind those options while you're installing new software – you don't want to leave a rogue checkbox filled in and stuff your fresh PC with all-new bloatware. ☒

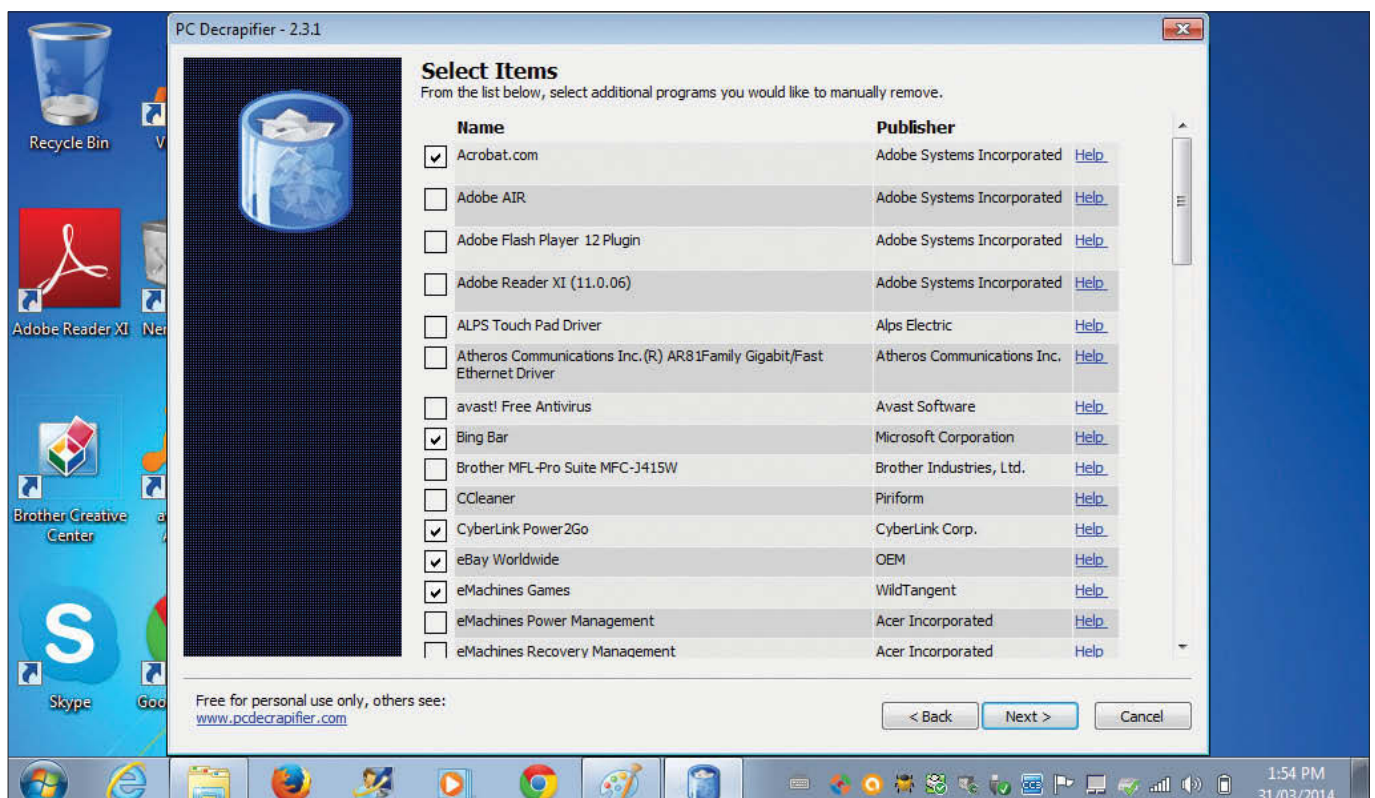
PC DECRAPIFIER is an automated tool that removes bloatware from a PC

A clean installation of Windows can give you the like-new experience that Microsoft intended, though novice PC users shouldn't try this

list of software in the Control Panel's 'Uninstall a Program' section (Control Panel > Programs > Uninstall a program) will let you see all and eliminate all the bloatware that takes the form of traditional desktop software. Automated tools such as PC Decrapifier (pcdecrapifier.com) can speed up the process. Should I Remove It (shouldiremoveit.com) does the same, while

If manual labour isn't your thing, a clean installation of Windows can give you the like-new experience that Microsoft intended, though novice PC users shouldn't try reinstalling their operating system.

You don't, however, want to rely on Windows 8's Refresh and Reset feature or your PC maker's recovery images. Some system manufacturers have begun sneaking



10 Chrome extensions for streamlined productivity



Boost your productivity with these 10 Chrome extensions. **Derek Walter** reports

While there are plenty of web-based tools and productivity tricks to help you power through tasks in your browser, you can step up and speed up your capabilities even more by grabbing some smart Chrome extensions.

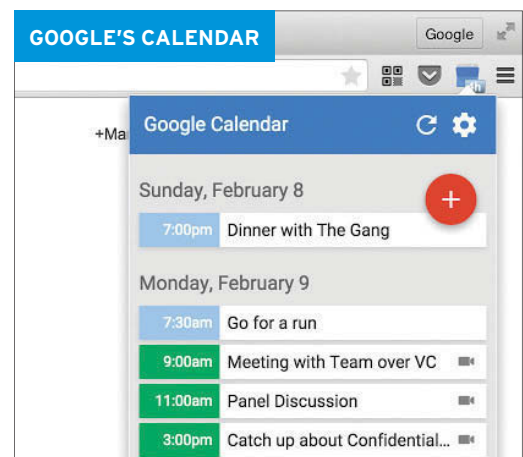
These add-ons add more functionality to Chrome for Windows and Chromebook users alike, enabling you to quickly save items to Google Drive, clip articles, or keep tabs on all your social media shares.

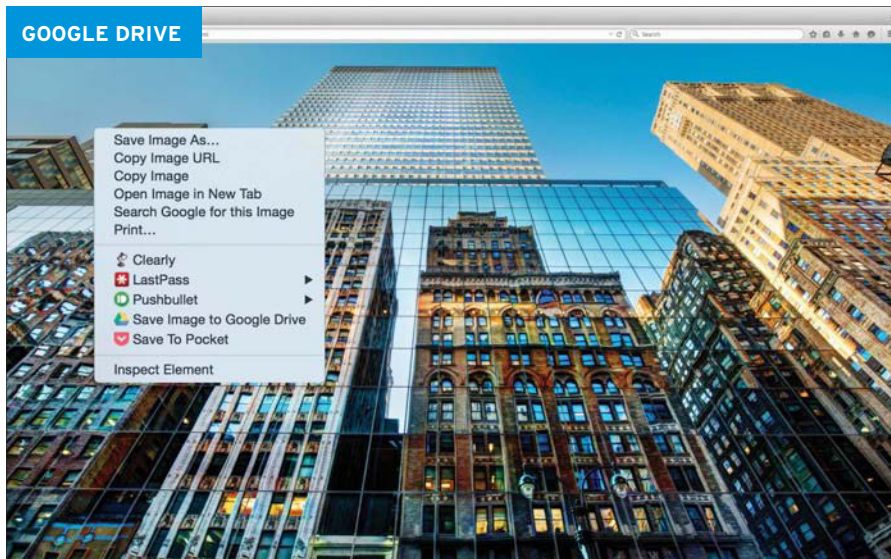
Google Calendar

The Google Calendar Chrome extension (tinyurl.com/pd7ty8r) simplifies several

tasks, eliminating the need to launch the calendar in another browser tab. It gives you quick access to creating a new event or checking out the upcoming schedule, so you don't miss that oh-so-riveting meeting.

The extension also allows you to add any date listed on a web page as a calendar entry. For example, if you see an event you want to attend, just highlight the text and right-click - you'll then get a popup to add it straight to your Google Calendar. It's a pretty slick feature, and makes this Chrome extension worth having around even if you're not an obsessive planner.





Save to Google Drive

Forget going through the pain of saving an image to your local hard drive and then separately uploading it to Google Drive. With the Save to Google Drive (tinyurl.com/ab97536) Chrome extension, you can do it with one click.

You can even clip an entire web page, saving it as a .png or html file – just right-click, and it'll be right there waiting for you in your Google Drive. You can also customise which Drive folder the images are saved in. Handy stuff indeed.

Snagit

The Snagit (tinyurl.com/mwLmbwg) Chrome extension lets you grab a screenshot or narrate a short video, then quickly save it to your Google Drive. It handles screencasting very well, which is useful if you narrate a lot of walkthroughs or videos for co-workers or clients. Because it directly saves your clippings in Drive, there's no need to dig through your downloaded files to locate

or share them. It's a powerful tool that is particularly Chromebook friendly.

Clearly

One of the most annoying aspects of today's web is all the clutter. Side columns, blinking ads, "Read this next!" suggestions – it's enough to make you go mad, especially when you're trying to focus on getting something done. Fight back with Evernote's Clearly (tinyurl.com/Lwhmz5h), which strips out all the peripheral content so you can just get to reading. While other extensions do the same, this one adds in the ability to mark up and highlight the article for easy saving to Evernote.

Google Chrome is dabbling with its own native reader mode, but Clearly is a long-standing tool that is essential if you're an Evernote power user.

Todoist

Todoist is one of the best cross-platform task managers out there. The Todoist

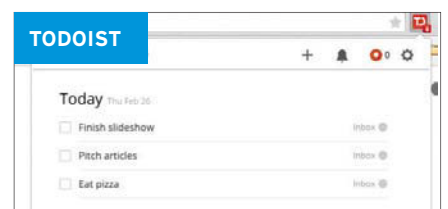
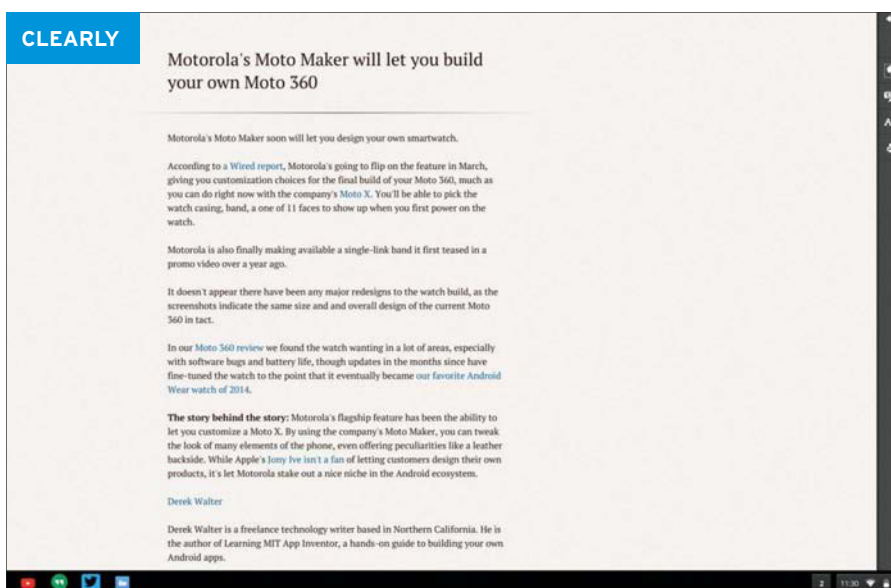


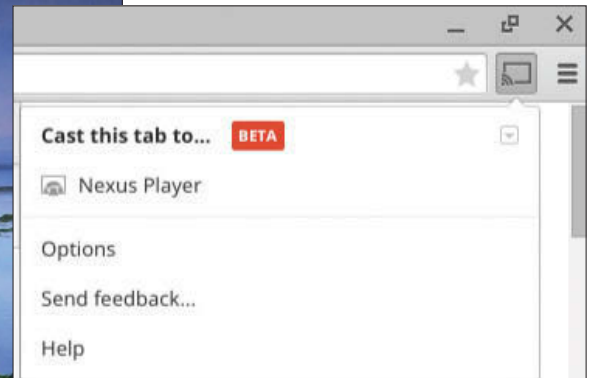
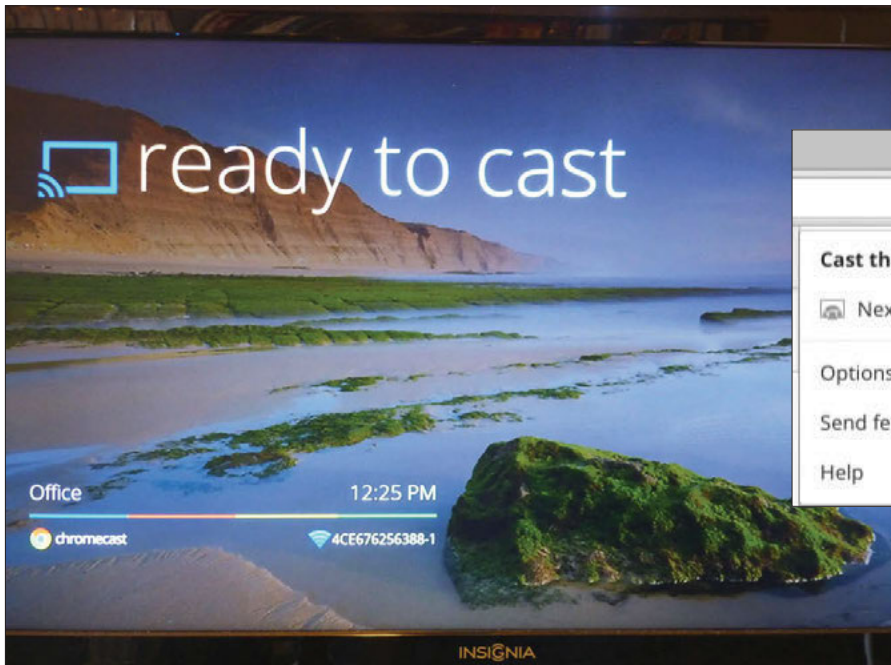
(tinyurl.com/ojwxegd) Chrome extension allows you to add tasks, assign them to others, and check in on what you should be doing right now. The extension works fine as a standalone to-do list at the free level, but a lot of its powers – such as being able to categorise your tasks and assign them to others – come from the premium subscription. Nevertheless, Todoist's worth checking out. It's handy to have tasks right there in the browser toolbar that sync up with the Todoist iOS and Android apps.

Goo.gl URL Shortener

Sharing links on social media is part of having an active Internet presence. This extension (tinyurl.com/cLdzgvu) quickly gives you a tweet-friendly link generated by Google's goo.gl service. It also keeps all kinds of cool stats on your links, so you can track how it did when shared across Twitter, Facebook, or other social networks.

Goo.gl URL Shortener also transforms your link into a QR code. It's the perfect little





GOOGLE CAST

tool that cuts down the steps needed to get your stuff out in the world.

Google Cast

Google's Chromecast isn't just for entertainment. If you're presenting a slideshow or showing a video to a group of colleagues or customers, it's the easiest way to cast your screen to another device.

So grab the Google Cast (tinyurl.com/mjagaxn) extension, which quickly finds any connected Chromecasts on the same wireless network. You won't have to fiddle with wires when you need to dazzle your colleagues.

Pocket

Pocket has grown beyond just being a read-it-later service (though it still excels at that).

It's now akin to a digital folder where you can save and share your research articles for work or school. Subscribing to Pocket's premium service (getpocket.com/premium) gives you additional search functions,

organisational features, and a permanent archive for all of your clippings.

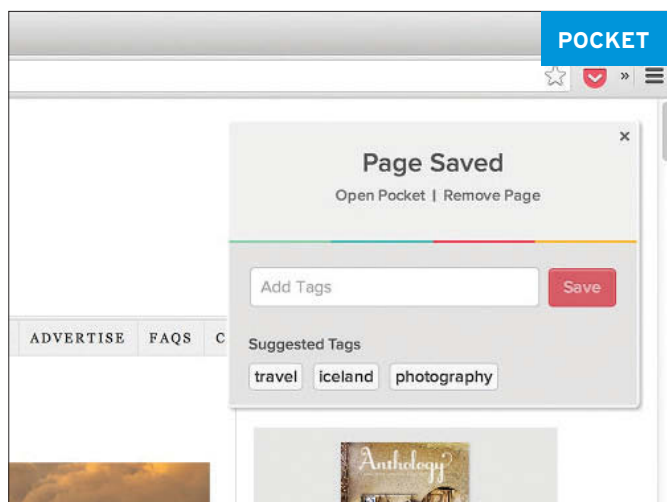
Even if you stick to the free level, Pocket's Chrome extension (tinyurl.com/kp7k84m) is worth having in your browser.

Lazarus: Form Recovery

Resurrect your forms from the digital beyond with Lazarus (tinyurl.com/aoj6srp). This clever Chrome extension recalls the text you input into any online form or box in the event your browser crashes.

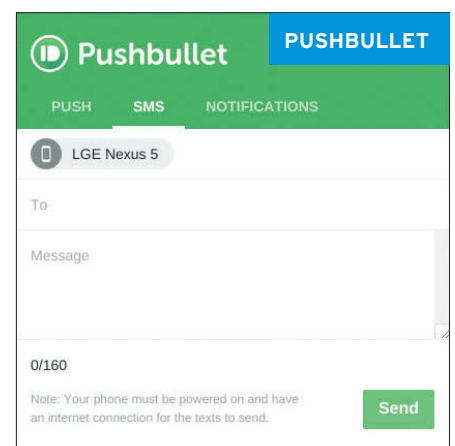
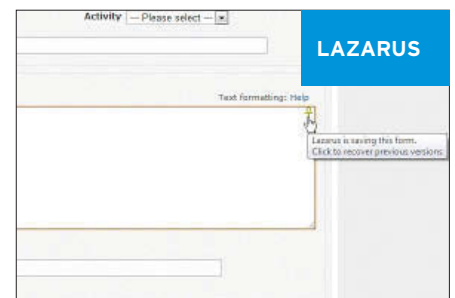
Google's web browser tends to be pretty stable, but it's always good to have a backup plan. And we've found its auto-fill feature can fill the boxes with info that isn't right for that context.

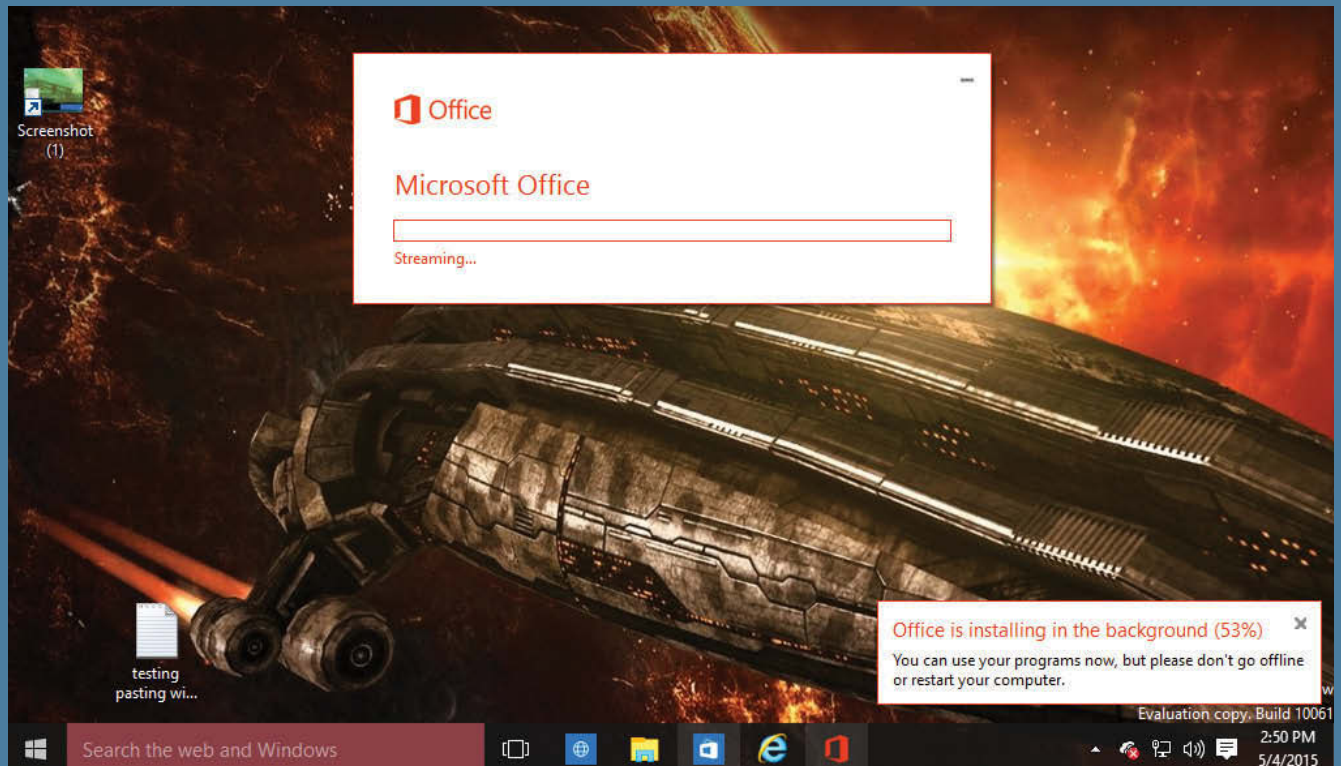
If your tab crashes, Lazarus will reload all the text that was on the page, which can be a huge time saver for filling out an application or online survey. You'll know it's working when the ancient Egyptian symbol appear on the screen.



Pushbullet

Nothing ties your phone and desktop together quite like Pushbullet (tinyurl.com/m2buung). With this Chrome extension, you'll be able to get notifications directed at your phone right in your browser - as long as you download the companion iOS or Android app, of course. There's also a neat feature that lets you copy text from the desktop and then paste it on your Android device. Pushbullet is always cranking out the new features, making it a must-have to help you leave your phone in your pocket while you're working. ☒





Download and install Office 2016 Preview

Brad Chacos reveals how you can take an early look at Microsoft's Office before its general release

Not long after releasing the locked-down Office 2016 developer preview, Microsoft has thrown open the proverbial doors to welcome all-comers to the Office 2016 consumer preview. Aside from the touch-enabled Office apps currently being tested with Windows 10, Office 2016 appears to be largely an iterative update to Office 2013. Nevertheless, Office 2016 will have all sorts of nifty new tweaks and tricks up its sleeve, like real-time document collaboration, the ability to both access data from and share data with third-party apps and other outside sources, and a TellMe search field that understands natural language queries to point you toward the exact features you're seeking.

In this article we explain how to install the Office 2016 Preview today. It's easy, though you'll need to be running Windows 7, 8, or 10 to use the new Office suite.

Forget the past

Before you install the preview, you'll need to remove any existing Office installations from your PC. Just like the official Office releases, the Office 2016 Preview doesn't play nice with its siblings.

Before you get started, jot down your current Office version's product key first, so you can reinstall your current version of Office when the Office 2016 Preview ends. (When we booted up the Word 2016 Preview on 4 May, a message appeared telling us that the preview will be valid for 179 more days, for what it's worth.) To uninstall your existing Office software, go to Control Panel > Programs > Uninstall a program and eradicate the Office programs.

If you don't have your product key handy, run Belarc Advisor (tinyurl.com/5w6o) before you uninstall Office. A report will pop up in your browser; look for the Office product key in the "Manage all your software licenses" portion of the page.

The next steps vary depending on whether you're an Office 365 subscriber, but either way, it's an easy process.

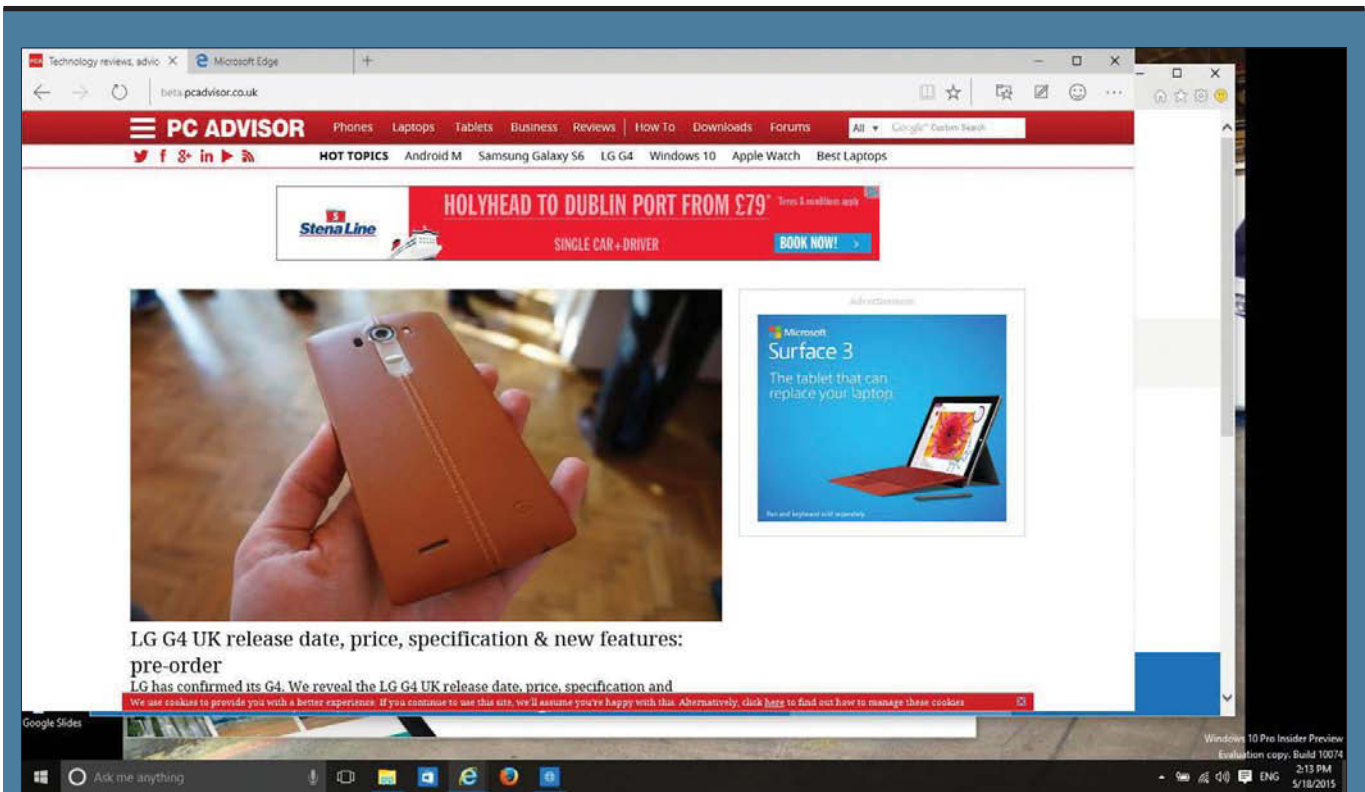
Install the Office 2016 Preview

Installing the Office 2016 Preview should be a breeze if you're an Office 365 subscriber. (Note, however, that our colleague Mark Hachman was unable to install Office 2016 via Office 365 for some reason, though we had no problems installing the standalone version.) Just head to your Office 365 My Account page, then click Language and install options. From here, click Additional install options. In the drop-down menu, select to install either the 32- or 64-bit version of the Office 2016 Preview. Once the software's installed, you'll need to enter the email address matched to your Office 365 subscription, the first time you boot an Office app.

The process is just as easy if you're not an Office 365 subscriber. Go to the Office 2016 Preview page (tinyurl.com/kfdpsbu) and download the executable for either the 32- or 64-bit version of Office. Once it's downloaded, click the program icon to begin the installation process. When you're prompted to enter the email address associated with your Office subscription the first time you boot an Office app, press the small blue 'Enter a product key' link underneath the field instead. Then use the following product key:

NKGG6-WBPCC-HXWMY-6DQGJ-CPQVG

That's it. Poke around, try all the new stuff, and be sure to send Microsoft feedback using the smiley-face icon in the upper-right corner. The tech giant wants to hear whenever you stumble across either pain points or frictionless experiences. That's what previews are for, after all. ☒



Get your hands on Microsoft's new browser

Download and use new features of Microsoft Edge browser in Windows 10. Chris Martin explains how

If you haven't heard yet, Microsoft has designed a new web browser for Windows 10. Previously known as Project Spartan, the software giant has announced that it will be called Microsoft Edge. If you want to try it out, you'll need to download and install Windows 10 Insider Preview (see opposite). It doesn't work with Windows 7, 8 or other versions of the operating system. Note that the preview still calls the browser Project Spartan.

Microsoft Edge features

Faster searching

Like some other web browsers, Edge allows you to search the internet by typing your query into the address bar.

Hub

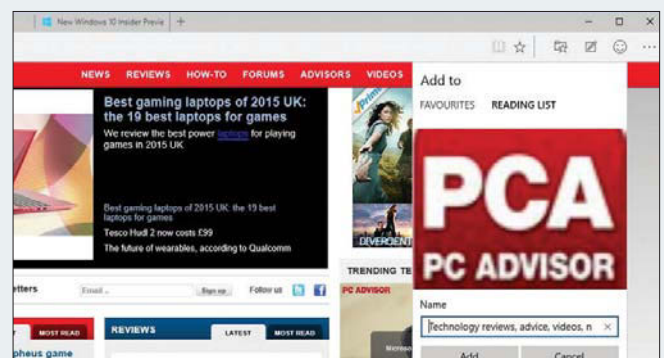
The Hub in Microsoft Edge is where important stuff you might need is kept. It's the folder icon with a star and stores favourites, your reading list, browsing history and current downloads.

Notes, highlights and annotations

A key feature of Microsoft Edge is the ability to annotate and highlight web pages. Click Web Note (the pen and paper icon) to begin, then use Pen, Highlight or Type to add whatever you want. You can then save and share your edits with the usual icons (yes, the floppy disk is still the universal symbol for save).

Reading list

As you might guess, the reading list lets you save articles or content to read later - whether you're on the train or just sitting in the garden with a beer. Select the star icon, hit Reading List and choose Add. You can then find saved content in your Hub.



Stay focused

If you're struggling to focus on an article, click the book icon to switch to a simple layout that focuses on the images and text. You can change your reading view style and font size by hitting the three dots icon and choosing Settings.

Cortana

Microsoft's digital assistant is also built into Edge (in the address bar), so you can interact with the browser in a different way. You can also highlight words or phrases on the page, press and hold (or right-click) and select Ask Cortana to get more information.

Feedback

If you have downloaded Windows 10 on to your PC or laptop and use Microsoft Edge, the firm is keen to get feedback to make it better. To do so, click the smiley face icon in the top-right corner of the window, fill out the form and hit send. ☒



Transfer files between PC, Mac and phone

Inateck's HB4009 allows you to transfer files between devices. Marie Brewis shows how

There are several ways to transfer files between PC, Mac and phone, including cloud services such as Dropbox, USB flash drives and external hard drives, but if you're looking for a simple hardware solution that you can plug in and forget about it, then we like this Inateck HB4009 USB 3.0 hub (pictured above).

In its simplest form the Inateck is a three-port USB 3.0 hub that you can plug into a PC or Mac and gain a couple of extra USB ports. But the HB4009 also has a 'Magic port', which allows you to transfer files between Windows, OS X and Android at USB 2.0 speed, share clipboards between PCs, and with KVM support even share a mouse between computers.

Inateck's HB4009 three-port USB hub is available from Amazon for £22. It supports Windows 7 and Mac OS X 10.6 or later, plus Android devices with OTG support. An OTG adaptor is supplied in the box, while a driver is built into the hub, so you won't need to carry any extra software discs or download them from online.

Transfer files between Windows and OS X

First, plug the USB hub into a spare USB port on a Windows PC. We're using a Windows 7 laptop, but the Inateck hub also supports Windows 8. AutoPlay will pop up asking what you want to do with the device, so click on Run SKLoader.exe.

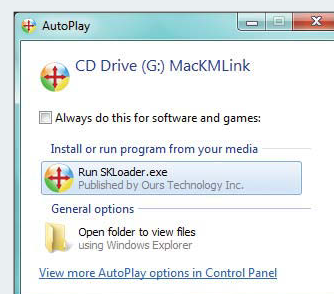
Also select 'Always do this for software and games', so that you won't have to go through this step each time you use the

Inateck. You now have a three-port USB hub attached to your Windows PC that you can use as you would any other USB ports on the laptop.

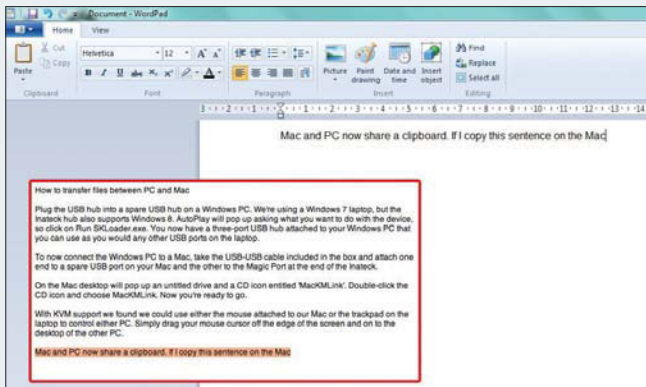
To now connect the Windows PC to a Mac, take the USB-to-USB cable included in the box and attach one end to a spare USB port on your Mac and the other to the Magic Port at the end of the Inateck.

On the Mac desktop an untitled drive will pop up and a CD icon called 'MacKMLink'. Double-click the CD icon and choose MacKMLink. Now you're ready to go.

With KVM support we found we could use either the mouse attached to our Mac or the trackpad on the laptop to control either PC. Simply drag your mouse cursor off the edge of the screen and on to the desktop of the other PC. (If you have any problem getting this to work, hit Alt-S to move the cursor to the other screen.)

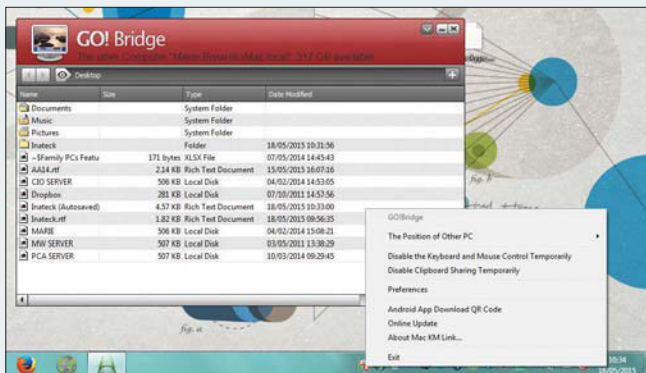


Mac and PC now share a clipboard. If I copy this sentence on the Mac, I can open a new document on the PC and hit Paste (and



vice versa). You can copy-and-paste files between PCs in the same manner, or you can simply drag-and-drop them between desktops. This will copy the file rather than moving it from the first machine.

Alternatively, use Go! Bridge. Tap on the MacKMLink icon in the taskbar and select Go! Bridge. This will open a file browser Window that shows your attached device, just as if it were a drive connected to your PC. You can now drag-and-drop files between folders on Windows and Mac.



Transfer files between Windows and OS X

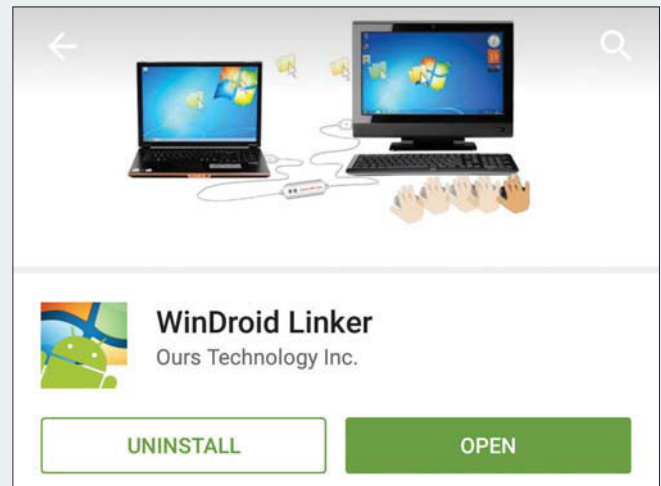
Having followed the above steps to set up MacKMLink between Windows and Mac, it doesn't matter whether Mac or PC is your host device. If you use the Mac as the host then you can, as before, tap Alt-S to move your cursor on to the PC screen, and you can share clipboards and copy-and-paste or drag-and-drop files. If you want to use Go! Bridge you'll have to access it from the Windows PC's taskbar icon, however.

Transfer files between Windows/OS X and Android

When used with Android the PC or Mac must be the host device. Plug the USB hub into a spare USB hub on a Windows PC or Mac. We're using a Windows 7 laptop, but the Inateck hub also supports Windows 8. AutoPlay will pop up asking what you want to do with the device, so click on Run SKLoader.exe. You now have a three-port USB hub attached to your Windows PC that you can use as you would any other USB ports on the laptop.

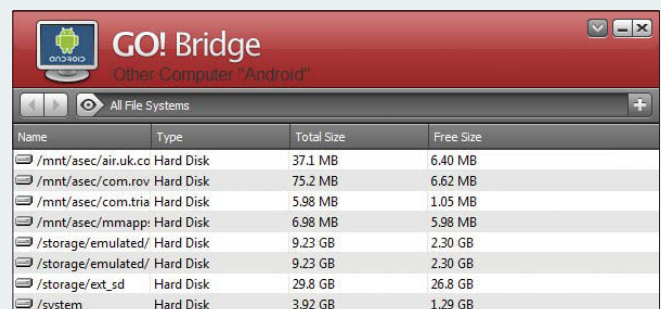
You'll need to download the free WinDroid Linker app on your Android device. There are two ways to do this, and the easiest is simply to search for and install it from Google Play. Alternatively, you can click the MacKMLink icon in the taskbar and choose 'Android App Download QR Code', then use the reader on your phone or tablet to get a direct link to the app download. (If you don't have a QR code reader app on your device then plenty of free

ones are available to download from Google Play.) On your phone or tablet tap the link in the web page and hit OK to go to the file in your browser. Hit OK again to download the .apk file. Drag down the notification bar and tap on the file download, then click Install.

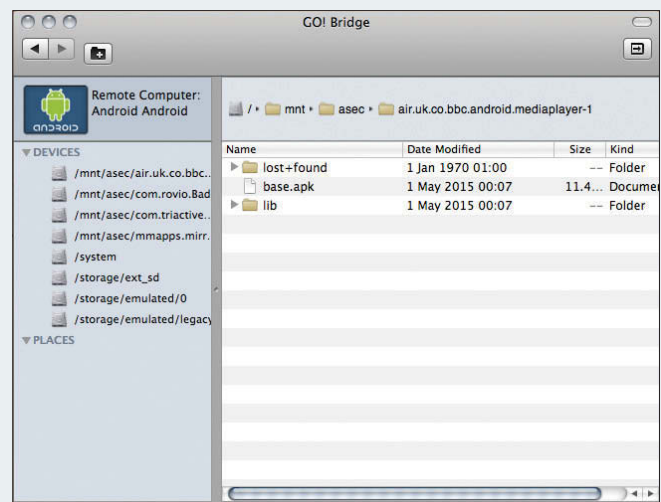


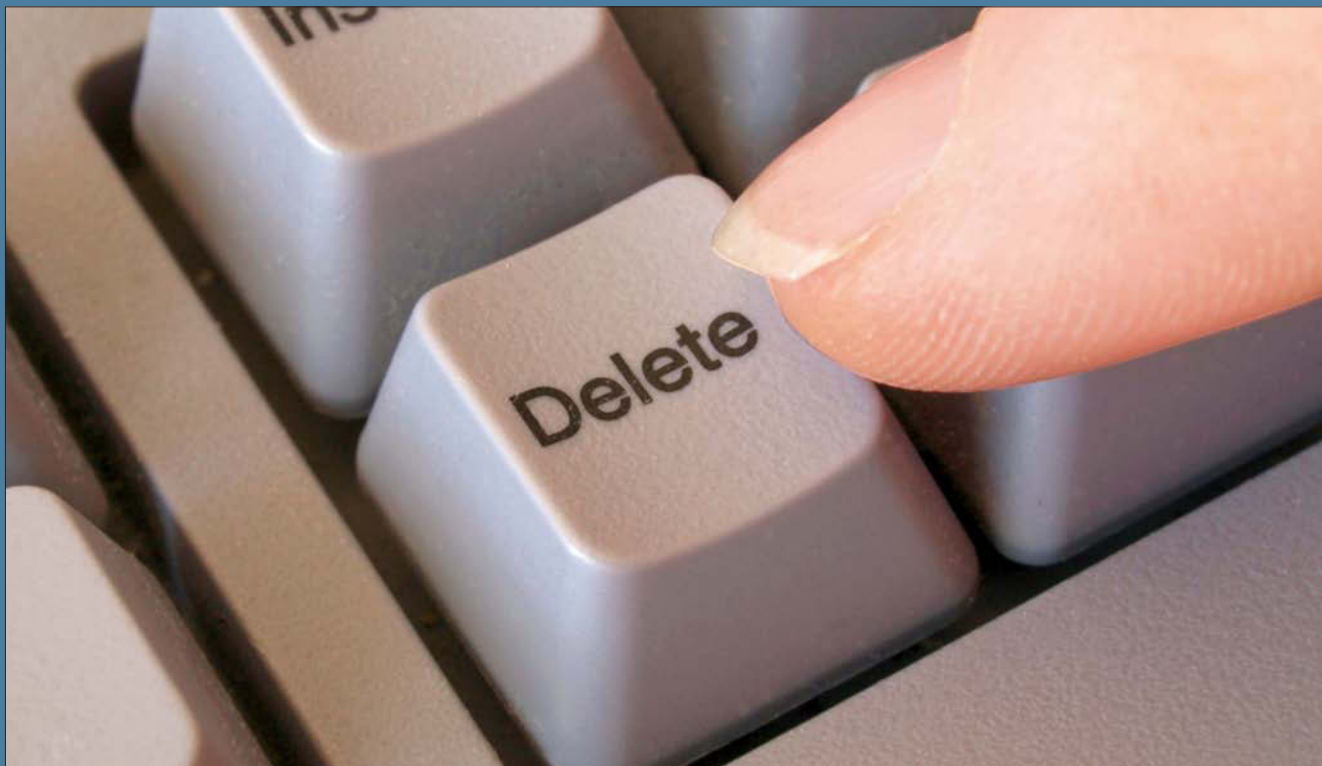
To now connect the Windows PC to an Android device that supports OTG, connect the OTG adaptor included in the box to one end of the supplied USB cable. Plug this end into your Android phone or tablet, and the other into the Magic Port at the end of the Inateck hub.

The Go! Bridge window will pop up on your PC screen showing your Android files, allowing you to transfer files between PC and Android. (If you're using a Mac as the host then you'll still get a window pop up onscreen showing your Android files.)



You can also use your PC or Mac keyboard and mouse to control your Android device - just hit Alt-S on the PC's keyboard to switch screens. The mouse cursor will then appear on your Android. ☒





Delete a corrupt file from a Windows PC

Jim Martin reveals how to erase a corrupted file or one that refuses to be deleted in Windows

Usually, it's easy to delete files, and it's much more common to delete a file by accident. However, there are some files that pose a problem and can't be erased.

A common problem is that a video file becomes corrupted and Windows can't remove it, no matter whether you push the Delete key or even the Shift+Delete combo. It isn't limited to video files, though. Practically any file can resist deletion, although the reasons behind the problem are varied.

There are lots of other ways to try deleting files. Here are just some of them. Hopefully, you'll find one of them works for you.

Close Windows Explorer

One of the most annoying error messages is 'File in use', which prevents you moving and deleting said file. If you've closed down all programs and you still can't delete it, it's probably because Windows Explorer is accessing the file, perhaps to display a thumbnail.

You can move all other files in the folder to a temporary folder and then delete the folder that contains the immovable file, but if this still doesn't work, try closing Windows Explorer. To do this, start Task Manager (right-click on the taskbar and choose Task Manager). Now look through the list of running applications for Windows Explorer, right-click on it and choose End Task. You can now use another application - another file manager, say - to delete the file. You'll have to install that first, of course.

Windows Safe Mode

A second option is to restart your PC in safe mode. Press F8 when the computer is starting up until you see the boot menu. Choose Safe Mode and a cut-down Windows will load. You can try deleting the file in Windows Explorer or File Explorer.

Third-party deletion utility

Lots of utilities can clean up troublesome files, including those that can't be deleted. They tend to create a script that runs when Windows boots up at a time before any restrictions are placed on the file preventing it being deleted. They include File Assassin (tinyurl.com/nhn36tp) and MoveOnBoot (tinyurl.com/8xgqh).

Use the Command Prompt

Yet another method is to use the Command Prompt. You'll find this in your Start menu, or Start Screen. Just search for it, click on it and a black window will open.

Change to the directory where the file is located by typing **cd** - for example, **cd c:\users\jim\desktop**. Now type **ls** to list the files in that folder. Next, type **delete**. You can use the Tab key to autocomplete the name of a file after typing the first few characters. You'll need to include the extension of the file, so you'd type **delete movie.mkv** to get rid of that video file.

Change the file extension

Sometimes this is the simplest way to delete a file that refuses to budge using the Delete key. If you have file called birthday.avi, select it in Windows Explorer, press F2 and change the extension - the .avi - to something else such as .txt.

You'll have to enable file extensions first, though, since Windows defaults to hiding extensions for known file types. To show extensions in Windows 8 onwards, click on the View tab and tick the 'File name extensions' box.

In previous versions, search for folder options in the Start menu. Click on it and a window will appear. Scroll down and untick the box for 'Hide extensions for known file types' and click OK. ☒



Get Skype's annoying features under control

Skype is a great tool, but has some frustrating features. Christopher Null shows how to remove them

Skype can't find webcam, speakers or microphone

One of the most common complaints with Skype is that it loses its connection to some essential component – either your camera, speakers or microphone. While some of these problems can be traced to hardware problems, driver issues, or simple Windows errors that rebooting can fix, many are caused by Skype's own confusion.

Your first troubleshooting stop is under Tools > Options. Click Audio Settings, then Show advanced options. Here you'll find a list of all the audio devices your computer has ever utilised. If you have, say, a headset that you occasionally plug in, it will show up here, greyed out. Problems occur when Skype accidentally attempts to use this device even if it isn't plugged in. You'll find a similar drop-down under Video Settings.

Call quality is terrible

Chances are this isn't really Skype's fault. Your Wi-Fi is slow, you're too far from the router, or there's congestion on your network. Attack these issues methodically. Assuming you're connecting wirelessly, move as close to your router as possible. (It should go without saying that connecting over Wi-Fi will be much more seamless than connecting over a cellular data connection.)

Another key tip: Once you park your laptop, tablet, or phone, keep it still. After you find a spot with good coverage, don't touch your device any more. This helps stabilise your wireless connection, so Skype can work with a less erratic amount of bandwidth, and it also improves quality by optimising video compression. Because the background is now static instead of in motion, fewer pixels will be changing in the image, which means more bandwidth is available to the important part of the image. Similarly, ensure other computers on the network aren't hogging bandwidth. If someone's streaming Netflix in another room, your Skype connection will suffer.

Skype replaces phone numbers in web browser with annoying 'Click to Call' buttons

First, uninstall Skype Click to Call, in the Windows Control Panel. Next, check your browser Add-Ons. If you see Skype Click to Call listed (there may be multiple items), disable them. Finally, within Skype visit Tools > Options > Advanced and uncheck the top two boxes to keep Skype out of your hair

If Skype's your only voice-calling solution, it might be handy to replace phone numbers on websites with links that you can click to initiate a Skype session. For the rest of us, it's needlessly intrusive and makes even the simple task of copying and pasting a phone number difficult.

Unused Skype credits vanish if they aren't used

If you've ever made a call from Skype to a landline, you probably have a few pounds in credits lying around. But if you don't use them at least once every 180 days, Skype inexplicably 'deactivates' your credits. It doesn't delete those credits, however. It just hides them in a virtual back room.

To get them back, look for a 'Reactivate credit' button where your balance used to appear. If it's not there, visit this web page to reactivate the credits manually. Signing in to your Skype account is required. (You can also check your balance and the date at which your credits will go dark on this page.)

Skype erupts with noisy notifications for everything

By default, Skype is a noisy companion. Skype will alert you with a chirp or beep and a text alert when just about anything happens, even when it's the birthday of one of your contacts. Tone things down by visiting Tools > Options > Notifications > Notification settings and unchecking the options you don't want to hear about. To quiet Skype down further, click the Sounds tab and uncheck any additional options you don't want, or click 'Mute all sounds'. ☒



Find and eradicate duplicate files on a PC

Ian Paul explains how to free up space on your PC by getting rid of superfluous data

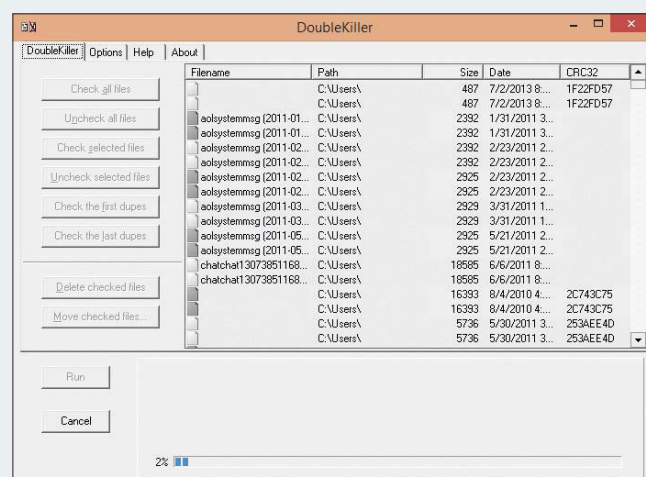
One of the pains of owning a PC that's getting towards the end of its life is dealing with the ever-shrinking amount of storage as your system fills up with music, photos, and documents. In the end, the only way to battle the bloat is often to get a new PC or more storage - but until you do, there are a number of tricks you can employ to make space on your computer.

A particularly handy one is to eliminate duplicate files and folders on your hard drive, getting rid of superfluous data you don't need. You'd be surprised how much content ends up duplicated on your PC thanks to a sync gone wrong with iTunes or an errant click with the photo importer. Here are three tools that can help you reduce the clutter on your system.

DoubleKiller

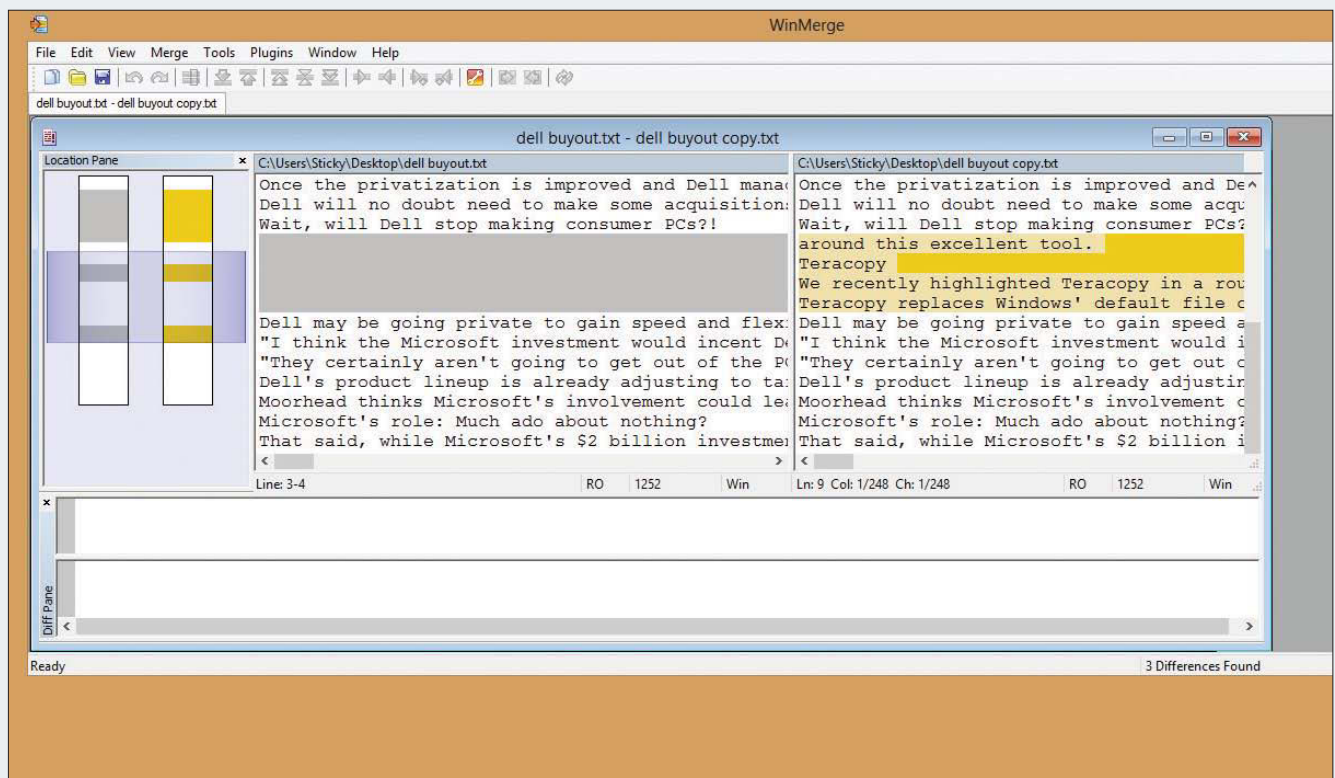
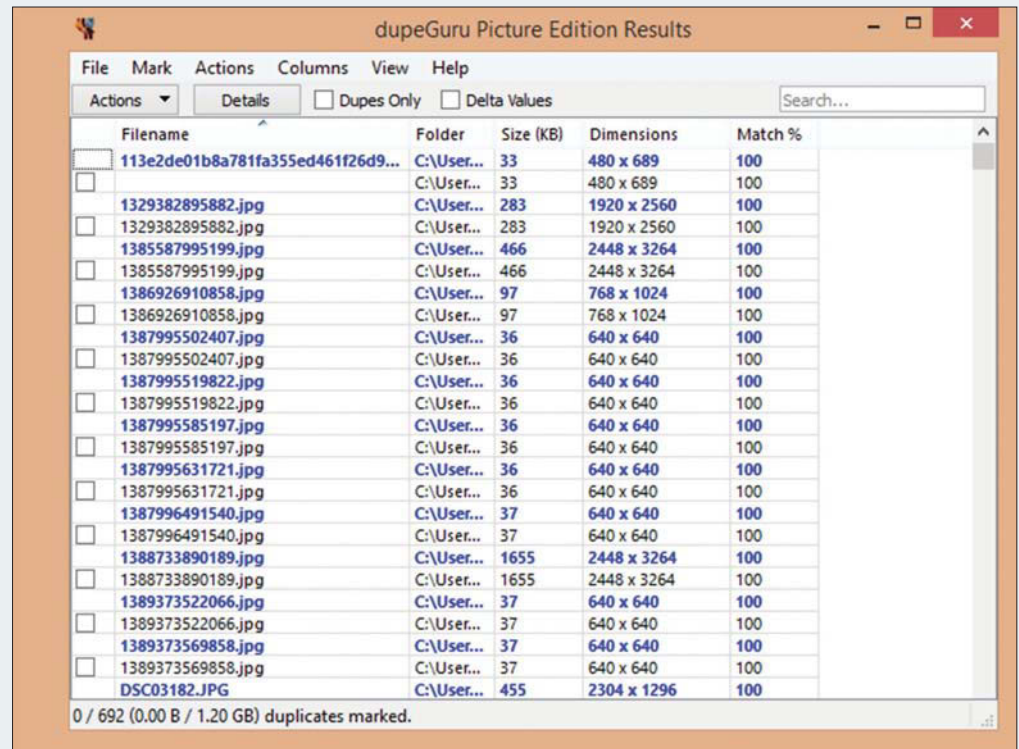
DoubleKiller (tinyurl.com/8tkj4) is an all-purpose duplicate finder that can scan folders, your whole drive, and even other computers on your local network. It compares file name, size, modification date, and even content (presumably by hashing a file's contents). The application also lets you exclude files by name, size, or type (XLS, MP4, and so on).

DoubleKiller has a lot of great features, but the interface may not be as straightforward as it could be. If you find yourself confused, start by adding some folders to scan under the Options tab then, go back to the DoubleKiller tab and click Run. Once it's done, you can decide to delete your duplicates or move them to another location.



dupeGuru Picture Edition

As its name suggests, dupeGuru Picture Edition (tinyurl.com/nLue4yf) is all about finding doubles in your image folders. Images can be one of the top sources of duplicates for many people, especially as we migrate to new PCs, restore data from backups, and keep pictures in different cloud services such as Dropbox, Google+, and OneDrive. DupeGuru PE is very easy to use. All you get is a simple window with options to add folders for scanning. When you're ready, just hit Scan and let the program do its magic, then decide what to keep once it's done.



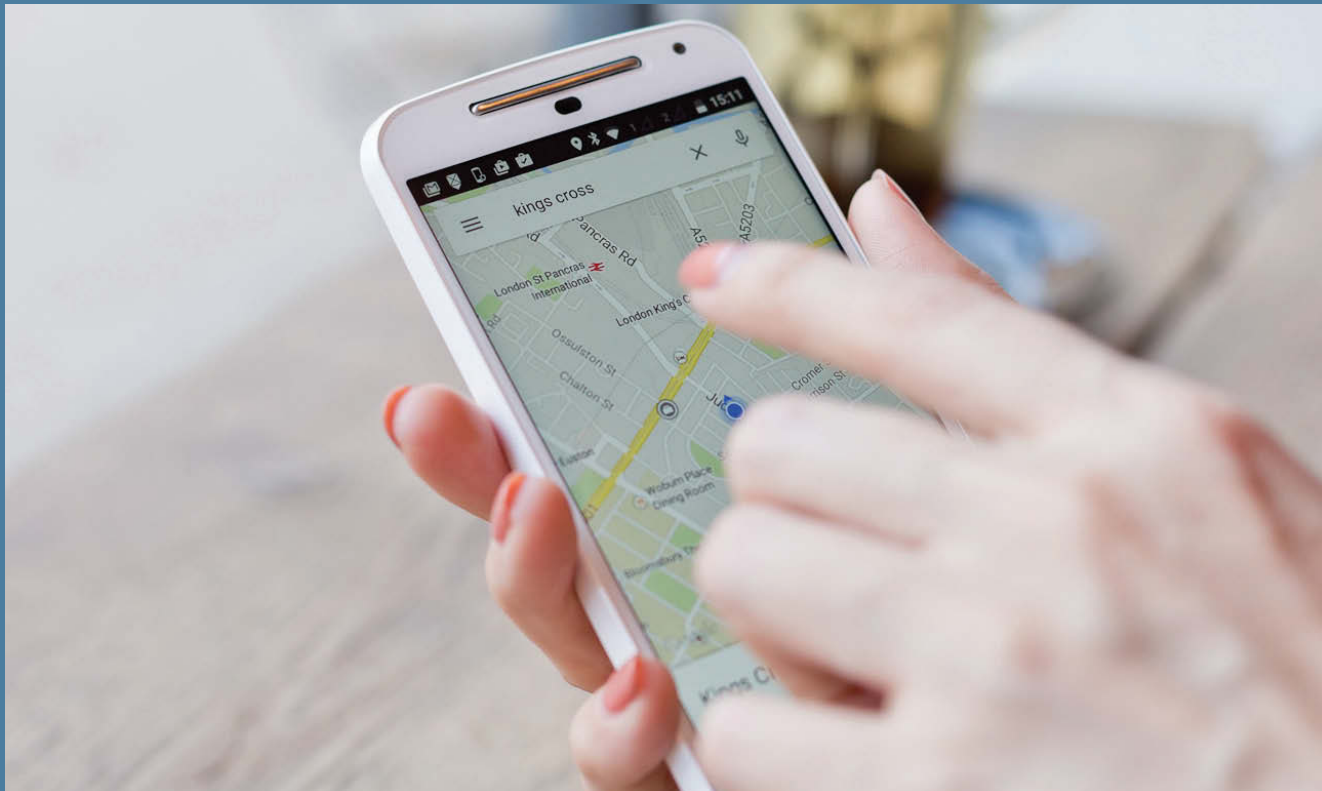
Winmerge

This is a seriously useful tool if you have a lot of documents or text files kicking around and need to pare them down. Winmerge (tinyurl.com/kdf5Lry) lets you compare two versions of a document (or an entire directory) and then view the actual differences between them on screen. You can then choose to merge the text into one preferred document.

Unlike the other tools, Winmerge isn't about searching your hard drive for duplicate files. Instead, you have to know that the two files

or directories you're comparing are similar or earlier versions of each other. The big advantage is that you can see the differences and then easily bring your files together into one canonical version. At first glance, you may find Winmerge's interface a little overwhelming, but don't be intimidated. The icons are designed to offer visual cues to help you understand how everything works.

With these three tools, you'll end up with a little more space on your hard drive in no time ☑



Find a lost Android, iPhone or Windows phone

Prepare now to help you find a lost Android, iOS or Windows phone. Marie Brewis reports

If you've lost your phone, it's not necessarily gone forever. But don't wait until you lose your phone to prepare: you'll need to configure it now to enable you to find a lost Android, iPhone or Windows phone. Here's how to set up phone tracking and how to find your phone.

Note that the solutions offered in this tutorial will require that your phone to be switched on in order to give you an accurate idea of its location, and to access options to remotely lock or wipe it. If your battery runs out or your phone is stolen and switched off, you may be out of luck. For that reason it's imperative that you back up everything now, just in case you can't get it back.

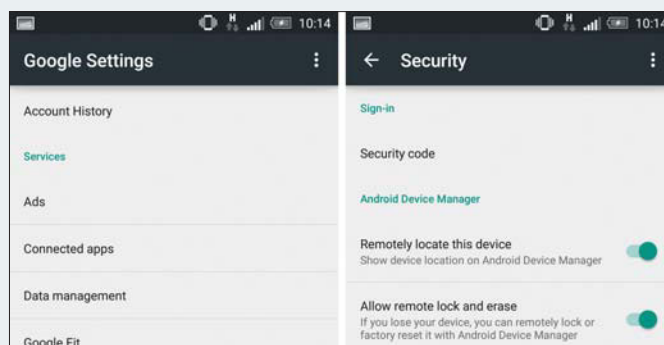
Over the following pages, we'll consider the options built into each major mobile operating system to explain how to track your lost or stolen phone. For each of these you will need to be signed into either your Google, Apple or Windows account on the phone before you begin.

Some third-party options are also available. Prey (preyproject.com) is a popular option, available not only for mobile devices but also Windows, OS X and Ubuntu laptops. If you have several devices spanning multiple platforms, it's worth considering an option such as this, which lets you track them all from a single interface.

How to locate a lost Android phone

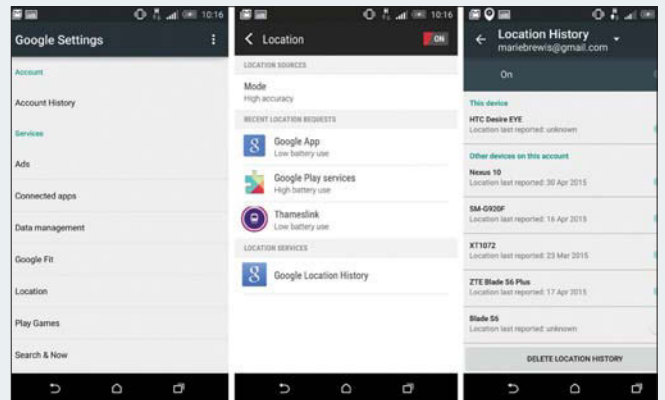
Device Manager offers the easiest way to track an Android phone. You don't need to have the app installed on your phone to use it, but you do need to check that your settings are correctly configured before you lose it.

To start using Device Manager, open the Google Settings app (not the phone's own Settings app) and tap on Security. Under Device Manager ensure the options to 'Remotely locate this device' and 'Allow remote lock and erase' are enabled. .

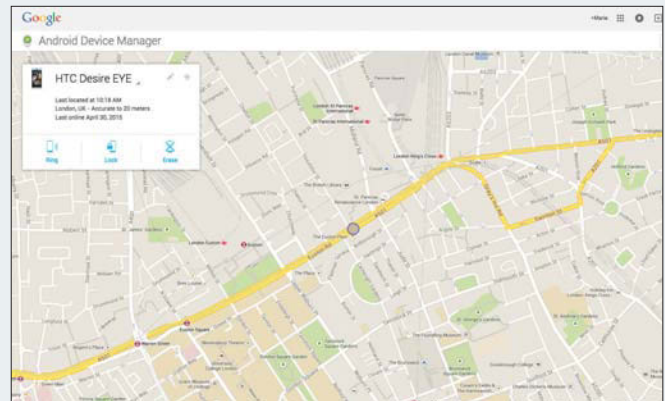


Location access also needs to be switched on for Device Manager to work. Once again open the Google Settings app, but this time choose Location. On the next screen tap 'Google Location History' under Location Services, then ensure it's switched on.

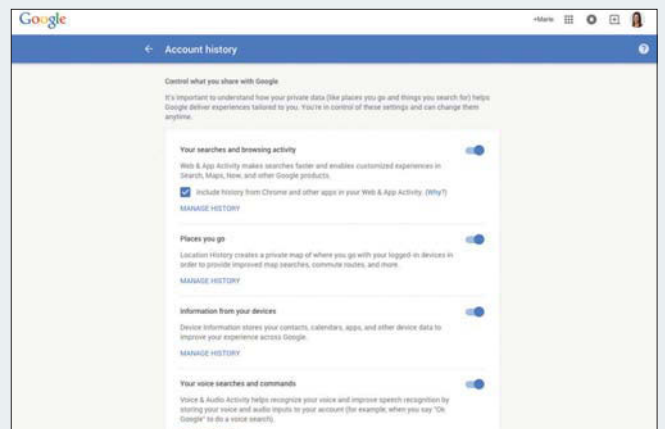
You now have two ways of tracking a lost Android phone.



If the phone is switched on and has a signal you'll be able to track it in Device Manager - head to tinyurl.com/Ldkm257 on another device and sign into your Google account. It should automatically find your device and report its location on a map. Also in Device Manager you'll find options to make the phone ring, lock out a suspected thief or wipe its contents. There is also an Android Device Manager app, which is useful if you have several Android devices to track. It's free from Google Play.

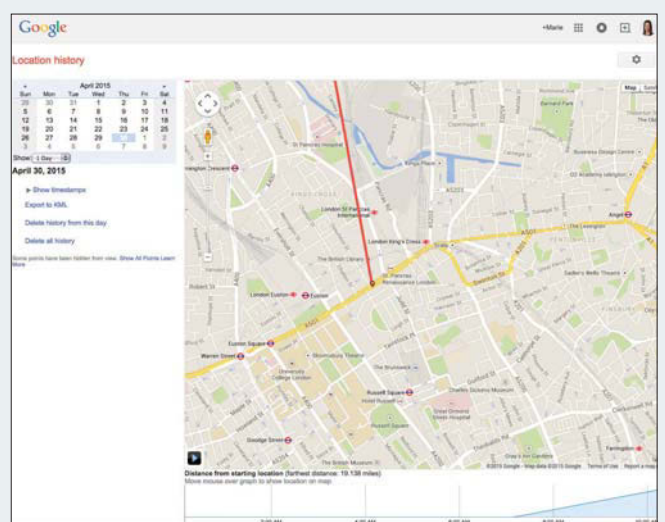


Another option, if your phone is switched off, is to check your location history to find its last reported location. You can do this by visiting tinyurl.com/oko2k4x and tapping on Manage History under Places you go.



You'll now see a map of all the places in which your device has reported its location during a time period that you specify. The last known location is where Google last saw it before the battery died, and if your luck's in it may still be there.

Note that location history uses Wi-Fi- and mobile signals rather than GPS, so it won't be as accurate as Android Device Manager.

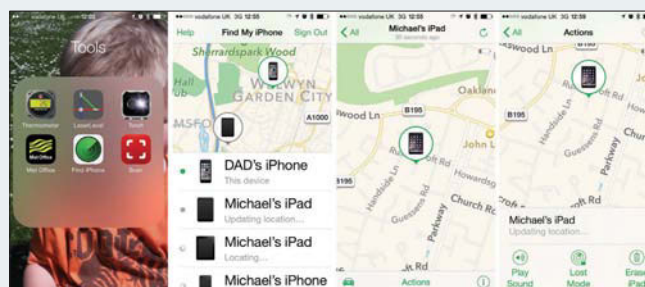


How to locate a lost iPhone

To locate a lost Apple device you need Find My iPhone - but before you lose your iPhone you'll need to ensure it's set up on your device. Just tap on Settings, iCloud, then scroll down to and enable Find My iPhone. Also turn on the option below, which sends your last known location just before your battery dies. Find My iPhone requires location services to be active, too, which you'll find under Settings, Privacy, Location Services.



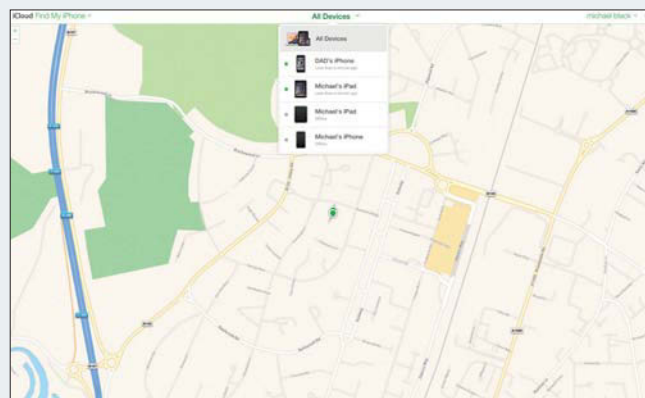
Having set up Find My iPhone, you have two ways to track a lost device. Firstly, you can use the free Find My iPhone app on another Apple device to track your phone.



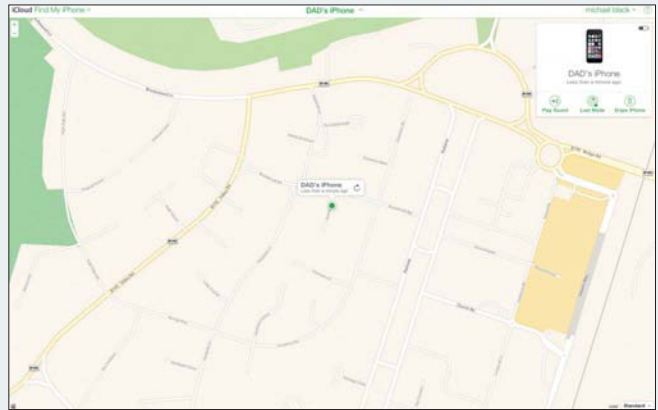
Alternatively, sign into your account on a desktop browser at [icloud.com](https://www.icloud.com), then tap Find My iPhone.



If you have multiple devices pick the one that's been misplaced.



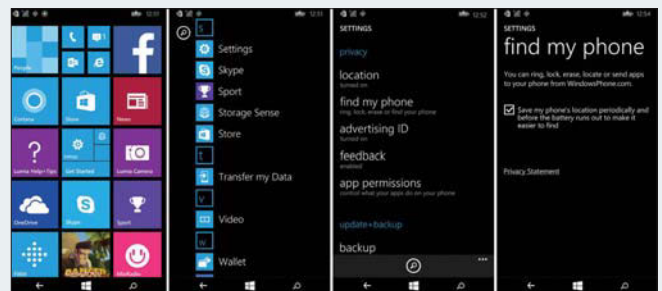
Having selected your phone, Find My iPhone will show you on a map its last known location, and offer options to sound an alarm, lock it or erase its contents.



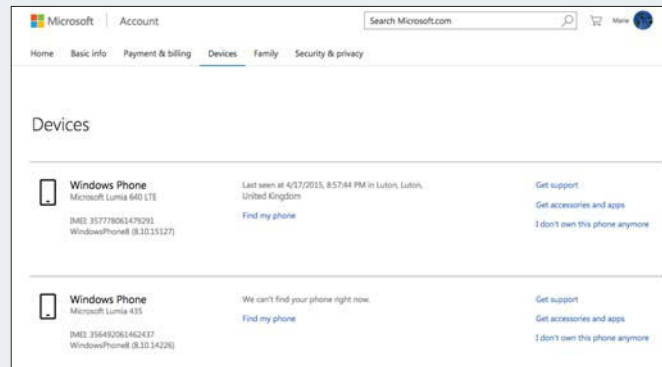
How to locate a lost Windows phone

Windows Phone also has its own built-in phone tracker feature. From the home screen swipe to the right to open the apps list, then scroll down to and select Settings.

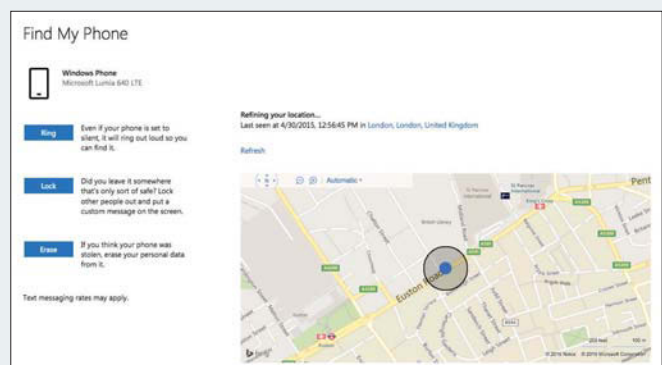
Scroll down the Settings pane until you find the Privacy section. Here you'll find options for Location and Find my phone. The first should be turned on by default; open the Find my phone option and enable the option to 'Save my phone's location periodically and before the battery runs out to make it easier to find'.



To later find a lost Windows phone, all you need do is log into your Windows account at tinyurl.com/nkL4ury. Hit Find my phone under the device you're looking to locate.



You'll now see a map onscreen showing you the last place your Windows phone reported its location. As with Android Device Manager, also here are options to Ring, Lock and Erase. ☒





Find a lost Fitbit or other Bluetooth device

Jim Martin reveals how to use a free app to track down a missing activity tracker

Activity trackers are great until you lose them, and it's easily done. It's easy to lose smaller trackers such as the Fitbit One and Zip, especially if you keep them in your pocket. Fortunately, you can install a free app that should help you to find a lost Fitbit and many other Bluetooth devices.

If you have an iPhone or iPad, head to the App Store and install the free BTLExplorer app (if using an iPad, then use the option to search for iPhone as well as iPad apps). It's designed for engineers to scan for Bluetooth gadgets and find which services and features they offer.

One function the developers probably never thought would be so useful is signal strength. When you launch BTLExplorer, it will automatically scan for Bluetooth peripherals and display a list. Next to each device is the signal strength in dB, and this is updated every few seconds.

The beauty of this capability is that once the app has picked up your Fitbit, you can walk around and figure out in which direction the signal gets stronger or weaker. It can't make your device vibrate or ring like Find My iPhone, but it should get you close enough to your lost tracker to find it down the back of the sofa, under the bed or in a sock drawer.

What you need to know about signal strength is that lower numbers mean a stronger signal because the figures are negative, not positive.

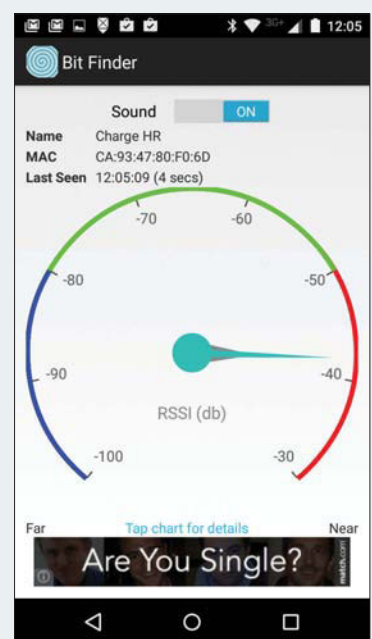
The bad news is that you'll need to be within 10- to 15m of your device for it to show up in the list. So it could take a while to

walk around your home, garden or wherever you think you lost your tracker before the equally slow process of homing in on it using the signal meter. That's the same for every app because of Bluetooth's limited range, though.

Android users have a wider choice of apps, including Bit Finder (For Fitbits), Signal Sniffer, Bluetooth Finder, Fitness Tracker Finder and more.

Bit Finder (pictured) is one of the better apps, but is ad-supported.

Signal Sniffer will find all Bluetooth devices, which can make the list far too long if you've lost your device in an office. While other apps filter out laptops, mice and other hardware, Signal Sniffer doesn't so could be handy if you've already tried Bit Finder and were unable to see your device. ☒





Send Gmail attachments to Dropbox

Michael Ansaldo shows how to create an automated workflow that sends attachments to your Dropbox

One of the pitfalls of Gmail's generous storage limits is the temptation to use it as a warehouse for all your email attachments. That seems like less of a good idea when you have to wade through your inbox for that report you need for the weekly all-hands in 15 minutes. But processing the daily influx of messages from clients, colleagues, and friends takes long enough without having to stop and manually save each attached file you receive. Fortunately, you can create an automated workflow to do it for you.

We're going to use If This, Then That (IFTTT) to create a system that automatically sends any new Gmail attachment to your Dropbox account, where it can be easily organised and accessed.

Create a trigger

First, login to IFTTT and click Create a Recipe from the dashboard. On the next page, the phrase 'ifthisisthenat' appears with the word 'this' highlighted. Click it, and you'll arrive at a veritable app store of trigger channels. Scroll down to the Gmail icon, or use the search field to jump to it, and select it.

The page will automatically scroll down to a grid of various Gmail Triggers - sets of conditions that will instigate a desired response. We're interested in email attachments here, so click on the 'Any new attachment' box. Click Create Trigger. The phrase 'ifthisisthenat' will appear again, only this time the word 'that' is highlighted. Click it.

Define the action

You've created a trigger that will fire every time you receive an email attachment. Now it's time to define what you want done with it. Select Dropbox from the list of available action channels, and click the 'Add file from URL' box from the grid of possible actions.

You'll be presented with a list of action fields - File URL, File Name and Dropbox Folder Path - each of which has a drop-down menu of options you can add and arrange to define that action.

Because we're separating attachments from their original emails, it's critical to name them so they're easily identifiable. Fortunately, IFTTT provides several options you can arrange into relevant naming schemes. To do this, click the beaker icon to the right of the File Name field and select as many options as you want from the drop-down menu in the order you want them to appear in the file name. A list of `{{AttachmentFilename}}` `{{FromAddress}}` `{{Subject}}` makes a pretty effective naming convention.

Similarly, click the beaker next to the Dropbox Folder Path field to define where your email attachments will be saved. The default path is 'IFTTT/Gmail', but you can enter your own or have one created automatically based on ingredients such as the sender, the date of receipt, or the email subject line.

Once you've defined these fields, click Create Action. Now all incoming email attachments will be automatically added to your Dropbox account. ☒



Speed up browsing on an Android device

Matt Egan explains how to supercharge your Android smartphone- or tablet's web browser

To an extent the dream of a mobile web-browsing device has become something of a nightmare. Despite the proliferation of mobile-, adaptive- and responsive websites, browsing on an Android phone or tablet can be a slow, laggy and buggy affair. It doesn't have to be. In this article, we'll look at one useful tweak that allows you to add greater memory allocation to the Chrome browser, making it a faster web-surfing experience. And we also offer a couple of tips for getting the Android Browser to play more nicely.

Allocate more memory to Chrome browser

This works only on the Chrome browser, which you may have to access from within the 'Google' section of your home page.

Open a new Chrome tab and type into the URL bar:

chrome://flags/#max-tiles-for-interest-area

You should see a warning about experimental features in Chrome, and beneath it a list of such features. Scroll down until you find 'Maximum tiles for interest area', which should be highlighted. Click the drop-down and you will see several options on a menu dialog - we could see 'Default', '64', '128', '256' and '512'. As you might expect, the numbers refer to the amount of memory set aside for the web browser. Switching up to 512MB from the default 128MB should speed up the web browser.

Once you have selected the required amount of RAM, you will be invited to 'Relaunch now'. Do so and Chrome will relaunch with the new memory allocation. You should find that pages load much more quickly. And you can, of course, reverse the process if for any reason the new memory allocation causes problems.

Disable JavaScript (and Flash)

Unlike the Chrome tweak outlined above, these changes require you to lose some functionality, but given that this functionality is Flash and JavaScript, you may not be too upset. You are in essence using an ad blocker on your mobile browser. Turning off JavaScript will significantly speed up web browsing on all Android devices, but it will also make some web pages look plain and lifeless.

To disable JavaScript on Android, open up the browser, and hit the three-dot 'Menu' icon in the top right-hand corner. Choose Advanced, and then scroll down to 'Enable JavaScript'. Untick this option and you should see speed improvements, in particular on desktop websites that haven't been optimised for mobile devices.

Flash is an option only on older Androids, but if it is on your handset you'll probably want to disable it. To do so, go into the Android browser, select the menu icon and choose Advanced. If you can see an 'Enable plug-ins', it is likely your browser is utilising a Flash plug-in. So untick that option. You should see immediate speed dividends. ☒

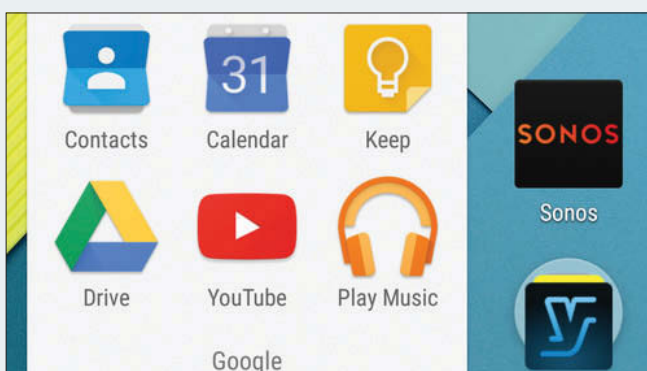


Get Google Music to download to an SD card

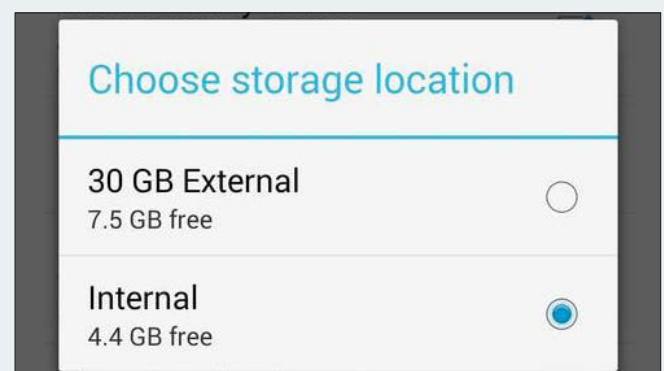
Make good use of your expandable storage with Marie Brewis' Google Play Music guide

For a while now, the Google Play Music app has had the ability to download tracks to microSD cards for offline listening. You'll need an Android smartphone or tablet with a microSD card slot and a microSD card with some free space.

The feature has been designed for Android 4.4 KitKat but Google said it is available for some older devices in 'experimental form'. So it's worth trying if you have an older device, but you may experience problems.

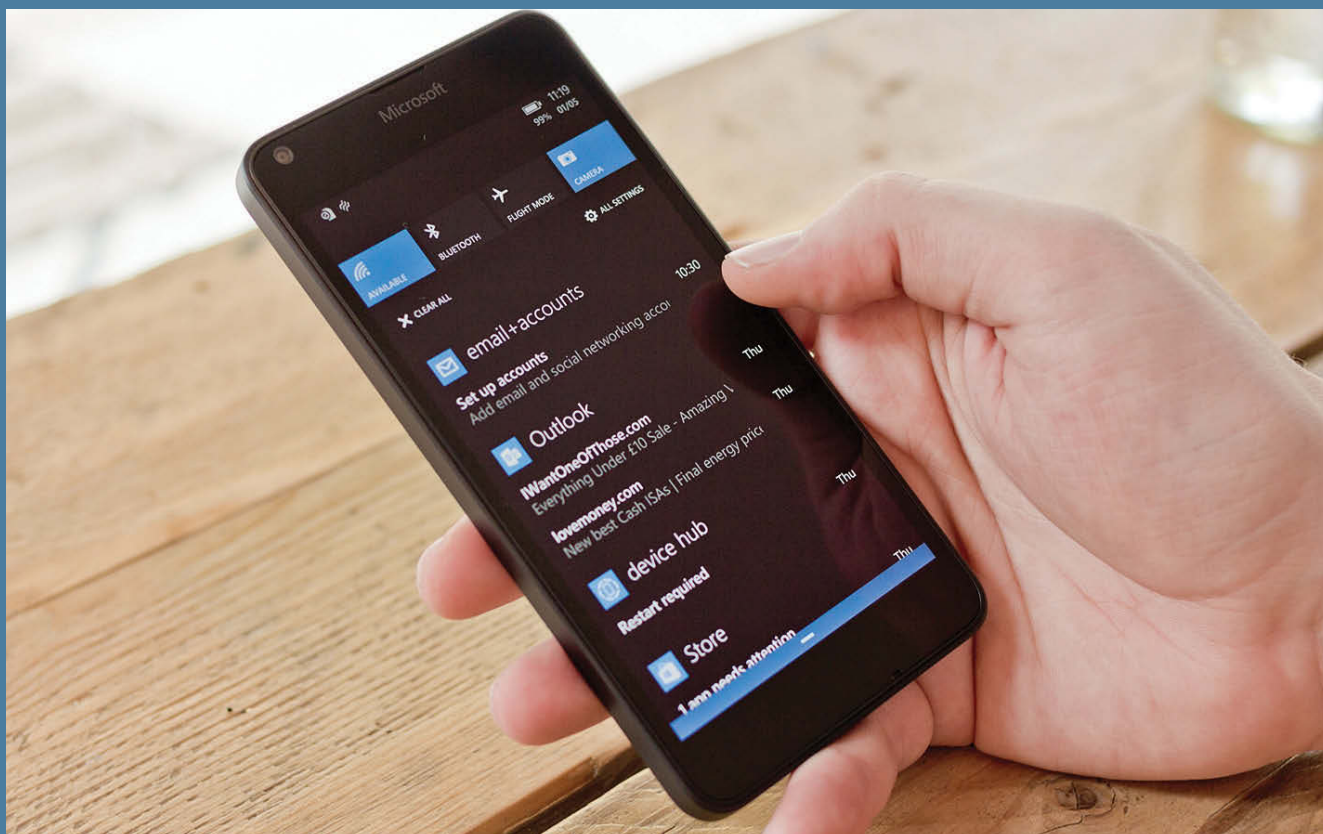


START Open the Google Play Music app on your device. Open the Settings menu which is found in the side bar on the left - either swipe in from the side or tap the three lines at the top-left of the app. Under the Downloading section of the menu tap on Storage location.



2 Now select External from the menu - it will tell you how much free space there is on your memory card.

Note: You can save music to your SD card, though you can't transfer music from your SD card to another device. ☒



Sync Google services with Windows Phone 8

Marie Brewis reveals how to get Google services on a Windows phone

A key criticism of Windows Phone is its lack of Google apps, but if you've just moved from Android to Windows Phone or simply enjoy the simplicity of Google's apps, there are ways to access Gmail, Google Contacts, Google Calendar, YouTube, Google Maps, Google Search, Google+ and even Google Drive on Windows Phone. Here's how to sync Google services with Windows Phone 8.

Sync Gmail, Google Contacts and Google Calendar

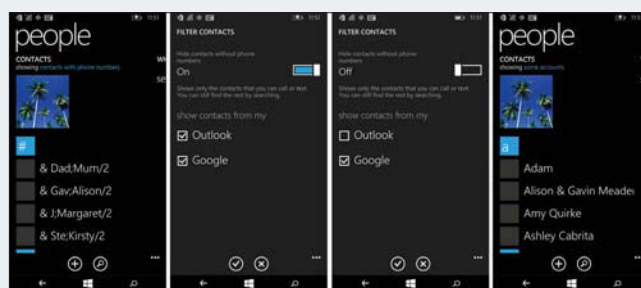
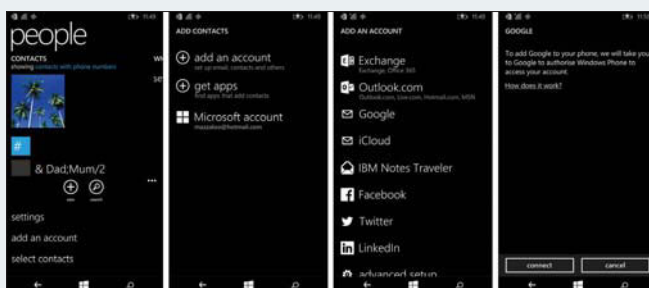
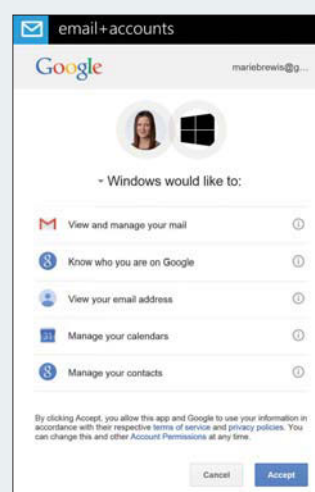
When adding a Google account to your Windows Phone, you can simply go to Settings > email+accounts > add an account, but we've always found it easier to deal with contacts and Gmail separately, allowing you to get the People, Google Mail and Calendar apps working exactly how you want them.

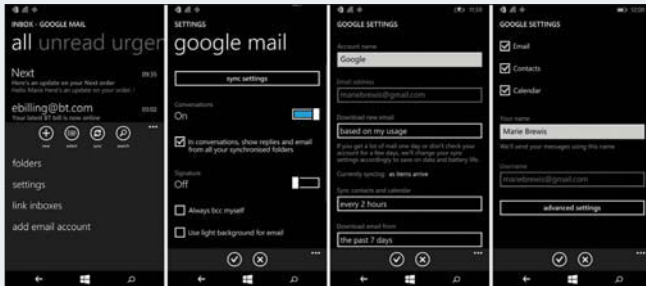
First, open the People app on your Windows Phone. Tap the three-dot icon at the bottom left of the screen and select 'add an account'. On the next screen once again tap 'add an account', then choose Google. Windows Phone will request

your permission to go to Google, so click Connect.

Sign into your Google account with your username and password, then accept the permissions requested by Google. Windows Phone will now sync your Google contacts.

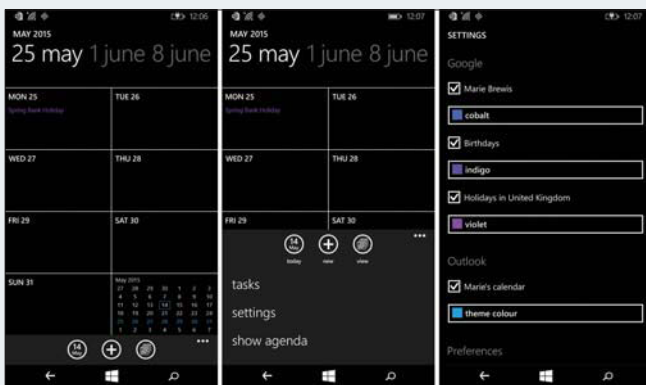
Having synced your Google account with Windows Phone, go back to the People app and tap on the link at the top that says 'showing contacts with phone numbers'. Under 'show contacts from my' select Google. Also here you can switch off your Outlook contacts to





avoid duplications, and choose to turn off hiding off contacts without phone numbers. Your People app will now show only your Google contacts.

You'll also now find a Google Mail tile on your home screen. Open this, then tap on the three-dot icon at the bottom left and choose Settings. From here you can choose Sync settings and choose how often Windows Phone should sync data with your



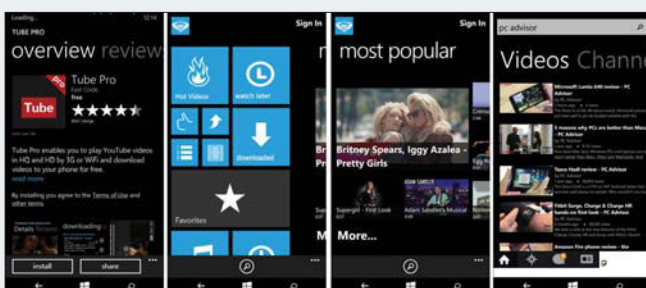
Google account. Scroll down the page and you'll find options to sync email, contacts and calendar, and you can deselect any you don't want to sync with Windows Phone. (You can access these same options by heading to Settings > email+accounts > Google.)

As with Google Mail, open the Calendar app and you'll find your Google Calendar has been synced with Windows Phone. Once again tap on the three dots icon at the bottom of the screen to access Settings, then specify whether you want to view your Google and/or Outlook calendars and how they should display.

Watch YouTube videos

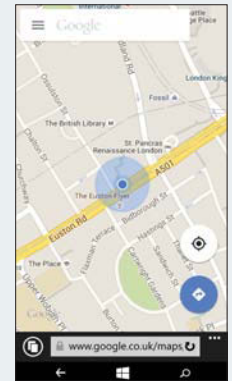
If you want to watch YouTube videos on Windows Phone 8 you'll need an app - but not the YouTube app. There are several third-party apps that allow you to browse YouTube, and a particular favourite is the free Tube Pro. Tube Pro also lets you download YouTube videos to Windows Phone 8, set up playlists and pin channels and playlists to live tiles.

To start using Tube Pro just open the Windows Store app and search for Tube Pro. Tap on the app, select install and, when prompted, allow the app to access your location (this is required).



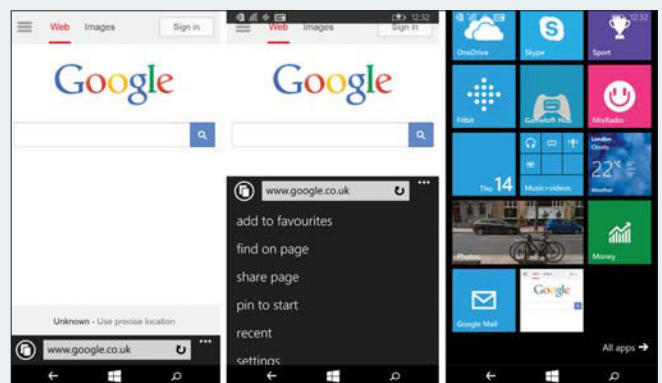
Use Google Maps

As with YouTube, there are several third-party apps on the Windows Store that purport to offer Google Maps. These aren't the real deal. However, it's possible to view Google Maps online in Internet Explorer. Just open the browser and head to maps.google.co.uk. You can then see your location on a map, get directions and more, as you would on a desktop computer or laptop.



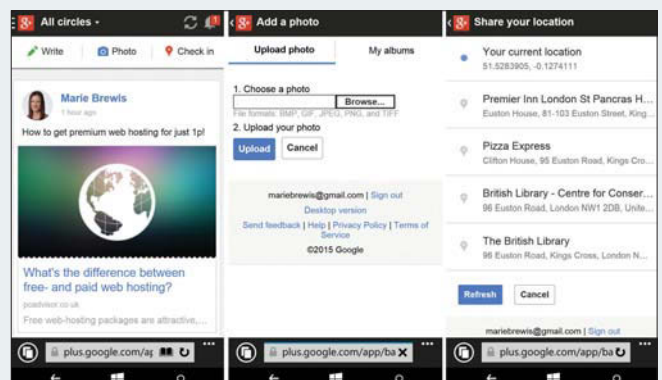
Use Google Search

Windows Phone uses Bing as the default search engine, but if you'd rather use Google Search then there is a workaround. Open Internet Explorer and browse to google.co.uk. Now tap on the three dots icon at the bottom of the screen and choose either 'add to favourites' or 'pin to start'. If you choose the latter, then you'll find a new tile on your home screen that will take you directly to Google Search each time you want to get online. Just fill in your search query and hit the magnifying glass as usual.



Use Google+

Google+ is another Google service you can access and use via the Internet Explorer browser on Windows Phone. Just open Internet Explorer, browse to plus.google.com and sign in. You can then post statuses and photos, check in and read other people's updates.



Use Google Drive

You can get read-only access to documents in Google Drive by opening Internet Explorer and browsing to drive.google.com. However, that's no good for creating and editing documents, and you can't download Google Sheets or Google Docs to Windows Phone. But we have heard that Microsoft Office - pre-installed on your phone and with cloud functionality - is a relatively decent productivity suite. ☒



ONLINE
REGISTRATION
REQUIRED

Ashampoo Anti-Virus 2015

FULL PROGRAM (SIX-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer, right-click the DVD icon and open the disc. Select Files 241\Ashampoo Anti-Virus 2015 and open the install file.

Online registration required: Follow the instructions within the program before 12 August 2015.

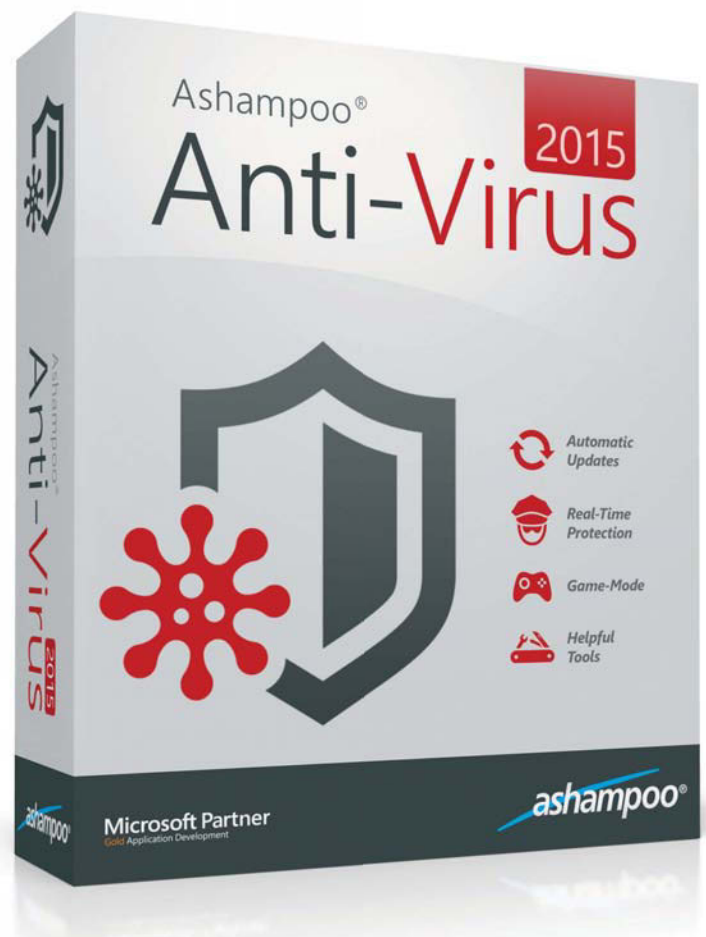
System requirements
Windows XP/Vista/7/8

Heavy on security but light on resources, Ashampoo Anti-Virus 2015 offers sophisticated real-time protection right out of the box. No configuration is required – simply install and forget.

The application provides sophisticated real-time protection without compromise. Viruses, trojans, spyware and other malware is automatically eliminated without slowing down the host PC. Even zero-day threats are neutralised using advanced behaviour blockers. The software is like a highly-skilled bodyguard that autonomously handles dangerous situations with as little user intervention as possible.

Highlights

- Real-time protection neutralises attacks as they happen
- Behaviour blocker monitors an application's behaviour and also eliminates not yet classified threats, such as zero-day exploits
- On-access guard neutralises infection attempts during file operations
- Multi-engine scanner with two scan engines for maximum accuracy
- Integrated self-protection to prevent program manipulation through malware
- Daily updates keep protection always up to date



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Auslogics Disk Defrag Professional

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REGISTRATION
REQUIRED**

FULL PROGRAM (FOUR-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 241\ Auslogics Disk Defrag Professional and open the install file.

Online registration required: Follow the instructions within the program before 12 August 2015.

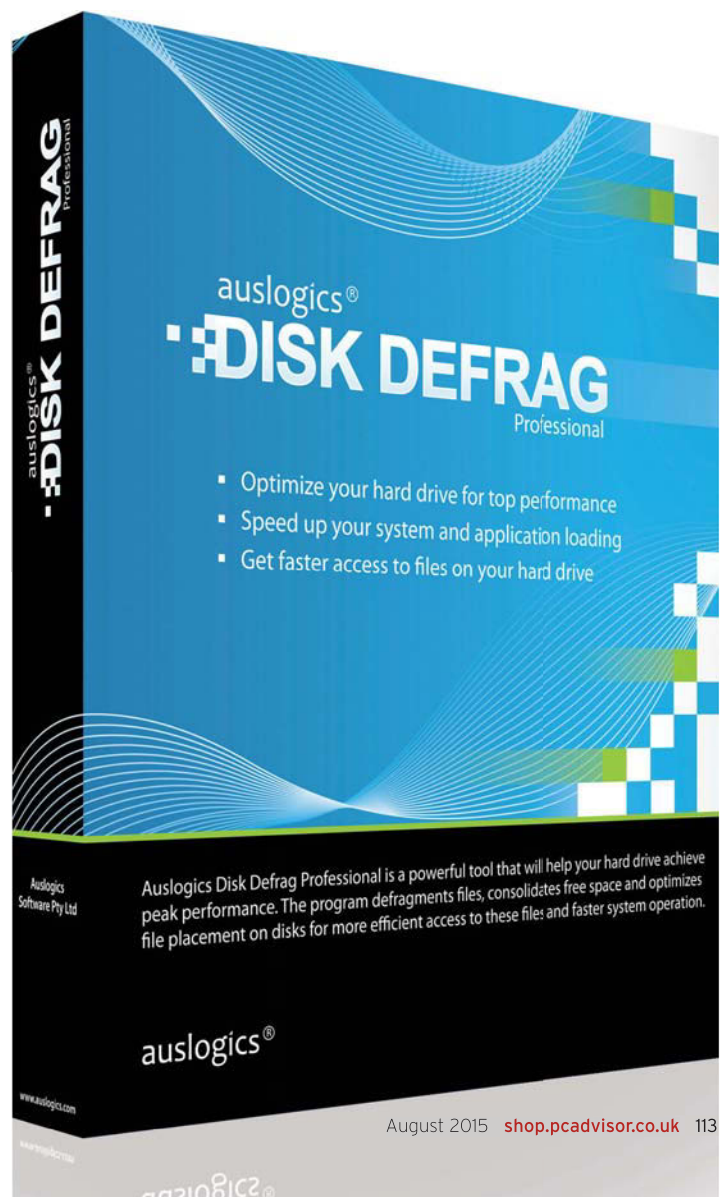
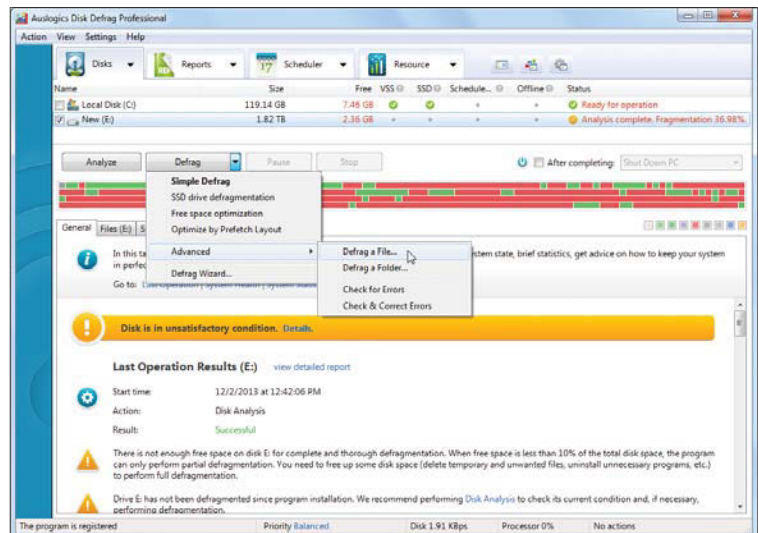
System requirements

Windows XP/Vista (32-bit only); Windows 7/8/10 (32- or 64-bit); 512MB RAM; 25MB drive space

Auslogics Disk Defrag Professional is an essential tool for optimising and maintaining your hard disks. It defragments files, consolidates free space and optimises file placement to make your hard disks run at peak performance.

This professional version of the program is equipped with more advanced features, such as extensive customisation options for defragmenting, optimising and scheduling tasks; informative reports and descriptions. Every feature or action is described in detail, interactive cluster maps allow you to click on individual blocks to view files located in them along with their status, and there's an option to defragment individually.

Disk Defrag Professional comes with four different types of optimisation techniques - by Prefetch layout, by last file access or change time, and by disk zone. It's also able to defrag locked system files, such as Windows Paging, Hibernation, MFT and Registry files. While default options allow you to perform operations with a click of a button, you can control the program's every action via its easily adjustable settings.



Incomedia WebSite X5 Home 11

FULL PROGRAM AVAILABLE ONLY ON THE DISC+

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OFFER
UPGRADE TO
EVOLUTION
11 AND
SAVE 25%

Installation details

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Online registration

required: Follow the instructions within the program before 12 August 2015.

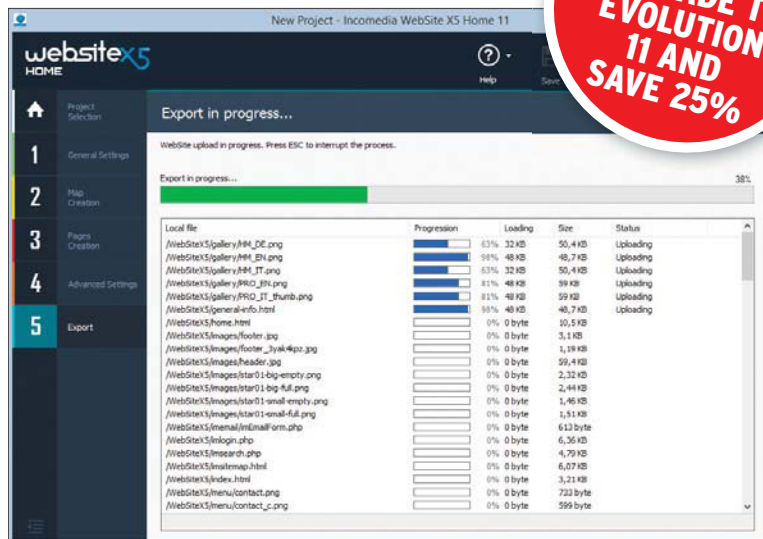
System requirements

Windows XP/Vista/7; 1GB RAM; 1024x768 screen resolution; internet connection

Creating websites with WebSite X5 Home 11 is easy and fun. You don't have to understand how to program in HTML, all you need to know is what you want to create. Indeed, you'll be surprised at how quick it is to create pages and get them online.

The software has over 250 ready-to-use graphic templates, and you can add up to 25 pages. Use its unique page creation approach to drag-and-drop objects on to the pages and create your contents: text, pictures, videos, audio and Flash animation. You can keep a check on your work throughout, while the logical and intuitive interface lets you quickly create pages. The software automatically creates the navigation menu with working links to all the pages.

WebSite X5 Home 11 also generates the page code for you, guaranteeing full compatibility with every web browser and mobile devices, such as Apple's iPhone and iPad. Finally, all you have to do is use the built-in FTP engine to get your website online with a web hosting service. ☒



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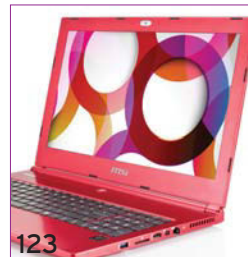
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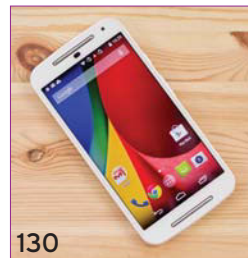
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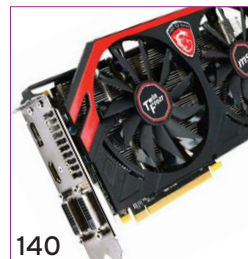
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	1	2	3	4	5
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Price	£1,720 inc VAT	£1,100 inc VAT	£1,299 inc VAT	£1,530 inc VAT	£1,100 inc VAT
Website	Aorus.com	Alienware.co.uk	UK.msi.com	Aorus.com	UK.msi.com
Launch date	Sep 14	May 15	May 15	Nov 14	Sep 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.4GHz Intel Core i7-4860HQ	2.4GHz Intel Core i7-5500U	2.6GHz Intel Core i7-4720HQ	2.4GHz Intel Core i7-4860HQ	2.5GHz Intel Core i7-4710HQ
RAM	16GB DDR3	8GB (2x 4GB) DDR3	16GB (2x 8GB) DDR3	16GB DDR3	16GB DDR3
Storage	1TB HDD, 3x 128GB SSD	256GB SSD	1TB HDD, 128GB SSD	2x 128GB SSD	1TB HDD, 2x 128GB SSD
Screen size	17.3in matt	13.3in matt	15.6in matt	14in matt	17.3in matt
Screen resolution	1920x1080	1920x1080	1920x1080	3200x1800	1920x1080
Graphics	2x nVidia GeForce GTX 860M	nVidia GeForce GTX 860M	nVidia GeForce GTX 965M	nVidia GeForce GTX 870M	nVidia GeForce GTX 860M
Video memory	8GB	2GB	3GB	6GB	2GB
Wireless	802.11a/b/g/n/ac	802.11ac	802.11ac	802.11a/b/g/n/ac	802.11b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 2x USB 2.0	3x USB 3.0	3x USB 3.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0, 2x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	✓	✓	x	✓	x
HDMI	✓	✓	x	✓	✓
DVI	x	x	x	x	x
VGA	✓	x	x	x	✓
eSATA	x	x	x	x	x
Media card slot	✓	x	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam	2Mp webcam	2.1Mp webcam	HD webcam	HD webcam
Operating system	Windows 8.1 64-bit	Windows 8.1	Windows 8.1	Windows 8.1 64bit	Windows 8.1 64-bit
Bundled software	None	None	None	None	None
Gaming scores	189/157fps in Tomb Raider	89/64fps in Tomb Raider	123/82fps in Tomb Raider	60.9/38.3fps in Tomb Raider	120fps in Batman (1080p)
Battery	74.7Wh lithium-polymer	52Wh lithium-polymer	48Wh lithium-ion	73.26Wh lithium-polymer	49Wh lithium-ion
Battery life	1 hr 48 mins	10 hrs 20 mins	2 hrs 49 mins	1 hr 48 mins	2 hrs
PCMark7 score	6304	5429	6241	6627	6241
Dimensions	425x303x24.5mm	328x235x26.7mm	389x265x20.3mm	330x263.5x22.9mm	418x269x39mm
Weight	3.24kg	1.97kg	2.04kg	1.8kg	3kg
Warranty	2-year return-to-base	1-year collect-and-return	2-year return-to-base	2-year return-to-base	2-year return-to-base
FULL REVIEW	TINYURL.COM/KLUXLGE	TINYURL.COM/08VXAGL	TINYURL.COM/06Q3JJD	TINYURL.COM/LS86960	TINYURL.COM/PU5L5GK

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Price	£399 inc VAT	£269 inc VAT	£219 inc VAT	£239 inc VAT	£410 inc VAT
Website	Lenovo.com/uk	Toshiba.co.uk	Acer.co.uk	Dell.co.uk	Acer.co.uk
Launch date	Jan 15	Jan 15	Sep 14	Dec 14	Jan 15
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	1.7GHz Intel Core i3-4010U	Intel Celeron	2.1GHz nVidia Tegra K1	1.4GHz Intel Celeron 2955U	2GHz Intel Core i3-4158U
RAM	4GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3
Storage	1TB HDD	16GB SSD	32GB SSD	16GB SSD	500GB HDD with 8GB flash
Screen size	15.6in gloss	13.3in IPS	13.3in	11.6in glossy	13.3in matt
Screen resolution	1920x1080	1920x1080	1920x1080	1366x768	1366x768
Graphics	nVidia GeForce 820M	Intel HD graphics	nVidia Kepler	Intel HD Graphics	Intel Iris Graphics 5100
Video memory	2GB	N/A	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 1x USB 2.0	2x USB 3.0	2x USB 3.0	1x USB 3.0, 1x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	x	x	x	x	x
HDMI	✓	✓	✓	✓	✓
DVI	x	x	x	x	x
VGA	✓	x	x	x	x
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack
Optical drive	DVD Writer	None	None	None	None
Extras	None	Webcam	Webcam	Webcam	None
Operating system	Windows 8.1	Google Chrome OS	Google Chrome OS	Google Chrome OS	Windows 8.1
Bundled software	None	None	None	None	None
Battery	41Wh Lithium-ion	9 hrs	9 hrs 20 mins	Lithium	48Wh Lithium-ion
Battery life	4 hrs 58 mins	Not tested	660ms	7 hrs 17 mins	6 hrs 35 mins
PCMark 8 Home score	1959	Not tested	Not tested	N/A	2358 (3396 Work)
Batman (Low/High)	33/29fps	Not tested	Not tested	N/A	29/24fps
Dimensions	382x265x27.5mm	320x214x19.3mm	18x327x227.5mm	295x201x24mm	327x227x20.6mm
Weight	2.4kg	1.35kg	1.5kg	1.3kg	1.5kg
Warranty	1-year return-to-base	1 year	1 year	1-year depot	1-year return-to-base
FULL REVIEW	TINYURL.COM/NJNNKWQ	TINYURL.COM/OP9NQAY	TINYURL.COM/Q2YT5AD	TINYURL.COM/NBUL2NO	TINYURL.COM/OQ94SKB

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Best ultraportable laptops	    				
	1	2	3	4	5
	Apple MacBook Pro 13in Retina	Apple MacBook Air 13in	HP Spectre 13-3010ea	Dell XPS 13 9343	Toshiba Kira-101
Price	£1,399 inc VAT	£849 inc VAT	£999 inc VAT	£1,099 inc VAT	£1,299 inc VAT
Website	Apple.com/uk	Apple.com/uk	Hp.com/uk	Dell.co.uk	Toshiba.co.uk
Launch date	July 14	Apr 14	Sep 14	Mar 15	Aug 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.8GHz Intel Core i5	1.4GHz Intel Core i5	1.6GHz Intel Core i5-4200U	2.4GHz Intel Core i7-5500U	1.8GHz Intel Core i7-4500U
RAM	8GB DDR3L	4GB DDR3L	8GB DDR3	8GB DDR3	8GB DDR3
Storage	512GB SSD	128GB SSD	256GB SSD	256GB SSD	256GB SSD
Screen size	13.3in glossy (anti-glare)	13.3in glossy (anti-glare)	13.3in glossy	13.3in IPS	13.3in glossy
Screen resolution	2560x1600	1440x900	1920x1080	3200x2000	2560x1440
Graphics	Intel Iris Graphics	Intel HD Graphics 5000	Intel HD Graphics 4400	Intel HD Graphics 5500	Intel HD Graphics 4400
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11ac	802.11b/g/n/ac
Ethernet	Optional	Optional	None	None	None
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	2x USB 3.0	3x USB 3.0
FireWire	x	x	x	x	x
Thunderbolt	2x	✓	x	x	x
DisplayPort	x	✓	✓	x	x
HDMI	✓	x	✓	x	✓
DVI	x	x	x	x	x
VGA	x	x	x	x	x
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	FaceTime HD webcam	HD webcam, multitouch trackpad, backlit keyboard	1080p webcam	720p webcam	720p webcam
Operating system	Mac OS X 10.10 Yosemite	Mac OS X 10.10 Yosemite	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 Pro 64-bit
Bundled software	iLife 11	iLife 11	None	Microsoft Office 2013 Trial	None
Gaming scores	Not tested	Not tested	31fps in Stalker (720p)	40fps Batman: Arkham City	17fps (1080p)
Battery	71.8Wh lithium-polymer	54Wh lithium-polymer	51Wh lithium-ion	52Wh lithium-polymer	52Wh lithium-polymer
Battery life	9 hrs 55 mins	12 hrs 57 mins	7 hrs 30 mins	6 hrs 12 mins	7 hrs 10 mins
PCMark 7 score	Not tested	4602	5006	Not tested	5100
Dimensions	314x219x18mm	325x227x4-17.5mm	324x220x15mm	304x200x15mm	316x207x19.8mm
Weight	1.57kg	1.35kg	1.52kg	1.3kg	1.26kg
Warranty	1 year return-to-base	1-year return-to-base	2-year return-to-base	1-year next business day	2-year onsite
FULL REVIEW	TINYURL.COM/PNTUMPW	TINYURL.COM/KNXWZ3	TINYURL.COM/N4CJQL9	TINYURL.COM/PPD3BYW	TINYURL.COM/QHP9F9T

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Best Chromebooks	1	2	3	4	5
	Toshiba Chromebook 2	Acer Chromebook 13	Dell Chromebook 11	HP Chromebook 14	Acer C720p Chromebook
Price	£269 inc VAT	£219 inc VAT	£239 inc VAT	£259 inc VAT	£249 inc VAT
Website	Toshiba.co.uk	Acer.co.uk	Dell.co.uk	Hp.com/uk	Uk.asus.com
Launch date	Jan 15	Sep 14	Dec 14	Sep 14	Jan 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	Intel Celeron	2.1GHz nVidia Tegra K1	1.4GHz Intel Celeron 2955U	1.4GHz Intel Celeron 2955U	1.4GHz Intel Celeron 2955U
RAM	4GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3	2GB DDR3
Storage	16GB SSD	32GB SSD	16GB SSD	16GB SSD	16GB SSD
Screen size	13.3in IPS	13.3in	11.6in glossy	14in glossy	11.6in glossy
Screen resolution	1920x1080	1920x1080	1366x768	1366x768	1366x768
Graphics	Intel HD graphics	nVidia Kepler	Intel HD Graphics	Intel HD graphics	Intel HD graphics
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 1x USB 2.0	2x USB 3.0	2x USB 3.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	x	x	x	x	x
HDMI	✓	✓	✓	✓	✓
DVI	x	x	x	x	x
VGA	x	x	x	x	x
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack
Optical drive	None	None	None	None	None
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS
Bundled software	None	None	None	None	None
Battery life	9 hrs	9 hrs 20 mins	7 hrs 17 mins	7 hrs 50 mins	6 hrs 7 mins
SunSpider score	Not tested	660ms	465ms	470ms	502ms
Peacekeeper score	Not tested	Not tested	2468	2478	2453
Browsermark score	Not tested	Not tested	3732	3643	3698
Dimensions	320x214x19.3mm	18x327x227.5mm	295x201x24mm	20.5x345x239mm	19.1x288x204mm
Weight	1.35kg	1.5kg	1.3kg	1.7kg	1.35kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OP9NQAY	TINYURL.COM/Q2YT5AD	TINYURL.COM/M3D3QJ4	TINYURL.COM/OCU7FTY	TINYURL.COM/O9KFZMA

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Best gaming laptops	    				
	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR BEST BUY	4	5
	Aorus X7 v2	Alienware 13	MSI GS60 2QD-470UK	Gigabyte P35W v2	Gigabyte P37x
Price	£1,720 inc VAT	£1,100 inc VAT	£1,299 inc VAT	£1,399 inc VAT	£1,750 inc VAT
Website	Aorus.com	Alienware.co.uk	UK.msi.com	Uk.gigabyte.com	Uk.gigabyte.com
Launch date	Sep 14	May 15	May 15	Jun 14	May 15
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.4GHz Intel Core i7-4860HQ	2.4GHz Intel Core i7-5500U	2.6GHz Intel Core i7-4720HQ	2.5GHz Intel Core i7-4710HQ	2.6GHz Intel Core i7-4720HQ
RAM	16GB DDR3	8GB (2x 4GB) DDR3	16GB (2x 8GB) DDR3	16GB DDR3L	16GB DDR3
Storage	1TB HDD, 3x 128GB SSD	256GB SSD	1TB HDD, 128GB SSD	1TB HDD, 2x 128GB SSD	2x 128GB SSD, 1TB HDD
Screen size	17.3in matt	13.3in matt	15.6in matt	15.6in matt	17.3in matt
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Graphics	2x nVidia GeForce GTX 860M	nVidia GeForce GTX 860M	nVidia GeForce GTX 965M	Intel HD 4600/GeForce 870M	nVidia GeForce GTX 980M
Video memory	8GB	2GB	3GB	6GB	8GB
Wireless	802.11a/b/g/n/ac	802.11ac	802.11ac	802.11a/b/g/n	802.11ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 2x USB 2.0	3x USB 3.0	3x USB 3.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0, 2x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	✓	✓	x	✓	✓
HDMI	✓	✓	x	✓	✓
DVI	x	x	x	x	x
VGA	✓	x	x	✓	✓
eSATA	x	x	x	x	x
Media card slot	✓	x	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam	2Mp webcam	2.1Mp webcam	HD webcam	0.9Mp webcam
Operating system	Windows 8.1 64-bit	Windows 8.1	Windows 8.1	Windows 8.1 64-bit	Windows 8.1
Bundled software	None	None	None	None	None
Gaming scores	189/157fps in Tomb Raider	89/64fps in Tomb Raider	123/82fps in Tomb Raider	60/40fps in Tomb Raider	221/153fps in Tomb Raider
Battery	74.7Wh lithium-polymer	52Wh lithium-polymer	48Wh lithium-ion	75.8Wh lithium-polymer	78Wh lithium-polymer
Battery life	1 hr 48 mins	10 hrs 20 mins	2 hrs 49 mins	4 hrs	4 hrs 2 mins
PCMark 7 score	6304	5429	6241	6226	6305
Dimensions	425x303x24.5mm	328x235x26.7mm	389x265x20.3mm	385x270x20.9mm	415x286x23.2mm
Weight	3.24kg	1.97kg	2.04kg	2.5kg	2.89kg
Warranty	2-year return-to-base	1-year collect-and-return	2-year return-to-base	2-year	2-year
FULL REVIEW	TINYURL.COM/KLUXLGE	TINYURL.COM/08VXAGL	TINYURL.COM/06Q3JDD	TINYURL.COM/09WUF8S	TINYURL.COM/NDPC6P6

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Best family PCs	1	2	3	4	5
	Chillblast Fusion Commando	Wired2Fire Diablo Reactor	Chillblast Fusion Pharoah	Mesh Elite 4670-PCA	Dino PC Raging Lizard V2
Price	£799 inc VAT	£668 inc VAT	£799 inc VAT	£799 inc VAT	£780 inc VAT
Website	Chillblast.com	Wired2fire.co.uk	Chillblast.com	Meshcomputers.com	Dinopc.com
Launch date	Jul 13	May 14	May 14	May 14	May 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.2GHz Intel Core i5-4570	3.4GHz Intel Core i5-4670	3.5GHz Intel Core i5-4690	3.4GHz Intel Core i5-4670	3.5GHz Intel Core i5-4690
RAM	16GB DDR3	8GB DDR3 1600MHz	16GB DDR3 1600MHz	16GB DDR3 1600MHz	8GB DDR3 1600MHz
Storage	1TB HDD + 120GB SSD	1TB HDD	1TB HDD + 120GB SSD	2TB HDD + 120GB SSD	1TB HDD + 128GB SSD
Motherboard	Asus B85M-G	Asus B85M-G	Asus B85M-G	MSI B85M-E45	Gigabyte H97M-D3H
CPU cooler	Arctic Cooling Freezer 7 Pro	Standard Intel Cooler	Standard Intel Cooler	Standard Intel Cooler	Standard Intel Cooler
Power supply	600W CIT	500W FSP	500W FSP	500W FSP	500W CIT
Screen	23in Iiyama X2377	24in AOC E2495Sh	23in Asus VS239HV	24in Iiyama E2483HS-B1	24in Iiyama E2483HS-B1
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Graphics	Zotac nVidia GeForce GTX 650 Ti	AMD Radeon R7 265	AMD Radeon R7 265	nVidia GeForce GTX 750 Ti	nVidia GeForce GTX 750 Ti
Video memory	N/A	2GB	2GB	2GB	2GB
Connectivity	802.11b/g/n, gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet, 802.11b/g/n
USB	3x USB 3.0, 6x USB 2.0	3x USB 3.0, 6x USB 2.0, 2x HDMI, VGA	3x USB 3.0, 6x USB 2.0, 2x DVI, 2x HDMI, DP, VGA	4x USB 3.0, 8x USB 2.0, HDMI, VGA, DVI-D, DVI, DP	5x USB 3.0, 3x USB 2.0, 2x HDMI (1x e-Mini), VGA, 2x DVI
Media card slot	None	None	None	None	None
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Speakers	2x Logitech LS220	None	None	None	None
Case	Cooler Master Force 500	Zalman Z3 Plus	Zalman Z3 Plus	Zalman Z3 Plus	Fractal Design Core 1000 USB3
Keyboard	Logitech MK260	Octigen wireless combo	Logitech MK270 (wireless combo)	Logitech MK270 (wireless combo)	Gigabyte KM6150 (wired combo)
Optical drive	LG BD-ROM/DVD±RW	LiteOn DVD±RW	LiteOn BD-ROM/DVD±RW	24x DVD RW	None
Operating system	Windows 8 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Bundled software	None	None	None	None	None
Sniper V2 Elite score (Low/High/Ultra)	147/59/14fps	240/76/18fps	240/76/18fps	195/68/16fps	196/83/20fps
Alien vs Predator score (720p/1080p)	52/27fps	83/44fps	83/44fps	71/37fps	102/53fps
PCMark 7 score	6177	3938	5953	7304	6431
Warranty	2-year collect-and-return	2-year return-to-base	5-year labour, 2-year collect-and-return	3-years labour (2-year parts, 3-months free C&R)	3-year labour (2-year parts)
FULL REVIEW	TINYURL.COM/KF6G3T7	TINYURL.COM/OA8UKDP	TINYURL.COM/K2KF83U	TINYURL.COM/OZCSHYU	TINYURL.COM/PFA55F7

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- 120GB Samsung 850 EVO SSD
- 1000GB SATA 7200rpm Hard Disk
- FSP 500W Power Supply
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Best gaming PCs	    				
	Eclipse SuperNova i5r285oc	Dino PC Dark Spark GTX 960	Cyberpower Infinity Achilles	Chillblast Fusion Mantis	Yoyotech Warbird Gam3r
Price	£999 inc VAT	£999 inc VAT	£999 inc VAT	£749 inc VAT	£999 inc VAT
Website	Eclipsecomputers.com	Dinopc.com	Cyberpowersystem.co.uk	Chillblast.com	Yoyotech.co.uk
Launch date	Mar 15	Mar 15	Mar 15	Mar 15	April 15
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.5GHz Intel Core i5-4690K (OC 4.4GHz)	3.5GHz Intel i5-4670K (OC 4.6GHz)	3.5GHz Intel Core i5-4690K	3.5GHz Intel Core i5-4690K (OC 4.2GHz)	3.5GHz Intel Core i5 4690K (4.2GHz OC)
CPU cooler	Zalman CNPS11X Extreme	Be Quiet Pure Rock BK009	Cooler Master Seidon 120mm RL-S12M-FLNN-S1	Corsair H55 Water Cooler	SilentiumPC Fera 2 Heatpipe Cooler
Memory	16GB HyperX Savage	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage	2TB HDD + 250GB SSD	1TB HDD + 120GB SSD	1TB HDD + 120GB SSD	1TB SSHD	2TB HDD + 240GB SSD
Power supply	550W XFX Core Edition	450W Corsair	600W Cooler Master	600W Corsair	600W Aerocool Integrator
Motherboard	Asus Z97-K	Gigabyte Z97X-Gaming 3	Gigabyte H81M-S2H	Gigabyte Z97-HD3	MSI Z97M-G43
Operating system	Windows 8.1	Windows 8.1	Windows 8.1	Windows 8.1 64-bit	Windows 8.1
Screen	26in HKC 2615	24in Iiyama GE2488HS-B1	24in AOC E2470SWDA	None supplied	23.6in AOC I2476VWM
Graphics	XFX AMD Radeon R9 285 DD Edition	Palit nVidia GeForce GTX 690	MSI nVidia GeForce GTX 970	MSI GeForce GTX 960	MSI nVidia GTX970 4GB
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Connectivity	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet
Ports	6x USB 3.0, 4x USB 2.0	6x USB 3.0, 4x USB 2.0, 2x PS/2, D-Sub, DVI-D, 6x SATA	6x USB 3.0, 3x USB 2.0, 2x DVI, HDMI, DP	6x USB 3.0, 2x USB 2.0, 2x DVI, HDMI, DP, PS/2	6x USB 3.0, 2x USB 2.0
Optical drive	Samsung DVD±RW	None	None	None	DVD±RW
Case	XFX Type 1 Bravo	NZXT Source 340	NZXT Source 340 Black	NZXT Source 340	CIT Kube Case
Keyboard & mouse	Cooler Master Storm Devastator Set	Corsair	Cooler Master Devastator Keyboard and Mouse	None	Gamdias Ares Keyboard and Mouse
Other	None	Corsair Raptor Bundle	None	Chillblast Family Software pack (optional)	None
PCMark 7 score	7931	7090	5945	5823	6244
Alien vs Predator score (720p/1080p)	111.4/59.8fps	103.4/54.7	167.8/89fps	104.2/55.2fps	1169.2/89.6fps
Final Fantasy XIV (Maximum)	91fps	86fps	120fps	86fps	137fps
Sniper Elite V2 (Low/Medium/Ultra)	292.1/106.8/26.5fps	285.6/123.6/28.9fps	281.1/192.9/48.1fps	289.3/123.8/29fps	429.4/204.3/49.1fps
Power Consumption	76/432W	77/310W	48/261W	50/277W	72/369W
Warranty	3-year return-to-base	3-year PromoCare	2-year parts, 3-year return-to-base, 30-day C&R	5-year labour (2-year collect-and-return)	1-year RTB (3-year labour only), 90-day C&R
FULL REVIEW	TINYURL.COM/K5AJLBO	TINYURL.COM/MVBK6KX	TINYURL.COM/KKKRRXAD	TINYURL.COM/L5H9ZDR	TINYURL.COM/NWZZZBM

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All-in-one PCs	1  PC ADVISOR RECOMMENDED	2 	3 	4 	5 
	Apple iMac with 5K display	Acer Aspire AZ3-615	Chillblast Volante A10	Asus Eee Top	HP Envy Beats 23-n001na
Price	£1,999 inc VAT	£799 inc VAT	£1,299 inc VAT	£799 inc VAT	£900 inc VAT
Website	Apple.com/uk	Acer.co.uk	Chillblast.com	Asus.com/uk	Hp.com/uk
Launch date	Dec 14	Dec 14	Dec 14	Dec 14	Dec 14
Build rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★★	★★★★☆	★★★★☆
Value rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	3.9GHz Intel Core i5-4690	2.7GHz Intel Core i5-4460T	4GHz Intel Core i7-4790S	2.6GHz Intel Core i5-4200U	3.2GHz Intel Core i7-4785T
RAM	8GB DDR3	8GB DDR3	16GB DDR3	6GB DDR3	8GB DDR3
Storage	1TB Fusion Drive	1TB HDD	1TB SSD	1TB HDD	1TB HDD
Screen	27in	23in touchscreen	24in	23in touchscreen	23in touchscreen
Screen resolution	5120x2880	1920x1080	1920x1080	1920x1080	1920x1080
Graphics card	AMD Radeon M9 M290X	nVidia GeForce GT 840M	nVidia GeForce GT 750M	Intel HD Graphics 4400	Intel HD Graphics 4600
Video memory	2GB	2GB	2GB	N/A	N/A
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	x	x	x	x	x
USB	4x USB 3.0	2x USB 3.0, 3x USB 2.0	4x USB 3.0, 2x USB 2.0	3x USB 3.0, 3x USB 2.0	2x USB 3.0, 4x USB 2.0
FireWire	x	x	x	x	x
Thunderbolt	✓	x	x	x	x
HDMI	x	x	✓	✓	✓
Media card slot	✓	✓	✓	✓	✓
Optical drive	None	DVD Writer	Blu-Ray Combo	DVD Writer	DVD Writer
Other	Final Cut Pro X, Logic Pro X, Aperture	1Mp webcam, wireless keyboard and mouse	Logitech MK520 wireless keyboard and mouse	2Mp webcam, Freeview TV, wireless keyboard and mouse	Wireless keyboard and mouse, Beats Audio stereo speaker system (8x 12W)
Operating system	OS X Yosemite	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Power consumption (idle/max)	46/215W	46/91W	35/177W	33/69W	43/81W
Sniper V2 Elite (Low/High/Ultra)	113.8/84/21.2fps	47.7/18.7/5.1fps	91.5/41.2/10.5fps	31.4/7.8/5fps	27.7/7.4/5fps
PCMark 8 Home score	4008	2906	3776	2828	2702
Dimensions	650x203x516mm	540x489x579mm	585x200x450mm	571x359x50-214mm	563x143x413mm
Weight	9.54kg	8.8kg	14.6kg	9kg	8.4kg
Warranty	1-year return-to-base	Not stated	5-year labour (2-year collect-and-return)	1-year return-to-base	1-year limited parts, labour, and pickup-and-return service
FULL REVIEW	TINYURL.COM/NWJUJSF	TINYURL.COM/QEY8FOE	TINYURL.COM/LO8A5MC	TINYURL.COM/PRPHC7L	TINYURL.COM/O6M4BCN

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Best smartphones	    				
	1	2	3	4	5
	Samsung Galaxy S6	Sony Xperia Z3 Compact	LG G4	LG G3	HTC One M9
Price	£349 inc VAT	£349 inc VAT	£500 inc VAT	£479 inc VAT	£579 inc VAT
Website	Samsung.com/uk	Sony.co.uk	Lg.com/uk	Lg.com/uk	HTC.com/uk
Launch date	Apr 15	Sep 14	May 15	May 14	Mar 15
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 5.0 Lollipop	Android 4.4 KitKat	Android 5.1 Lollipop	Android 4.4 KitKat	Android 5.0 Lollipop
Processor	2.1GHz Exynos 7420	2.5GHz Snapdragon 801	Snapdragon 808 six-core	2.5GHz Snapdragon 801	Snapdragon 810 octa-core
RAM	3GB	2GB	3GB	2GB/3GB	3GB
Storage	32/64GB	16GB	32GB	16GB/32GB	32GB
MicroSD support	No	Up to 128GB	Up to 128GB	No	Up to 128GB
Graphics	Mali-T760 GPU	Adreno 330	Adreno 418	Adreno 330	Adreno 430
Screen size	5.1in	4.6in	4.5in	5.5in	5in
Screen resolution	1440x2560	720x1280	1440x2560	1440x2560	1080x1920
Pixel density	577ppi	319ppi	538ppi	534ppi	441ppi
Screen technology	Super AMOLED	IPS	IPS	IPS	IPS
Front camera	5Mp	2.2Mp	8Mp	2Mp	4Mp (UltraPixel)
Rear camera	16Mp, LED flash	20.7Mp, LED flash	16Mp	13Mp, LED flash	20Mp
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Micro-SIM	Micro-SIM	Nano-SIM
Dual-SIM as standard	No	No	No	No	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.1	Bluetooth 4.0	Bluetooth 4.1	Bluetooth 4.0 (aptX)	Bluetooth 4.1 (aptX)
GPS	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	Yes	Yes	Yes	Yes	Yes
USB OTG	Yes	Yes	Yes	Yes	Yes
Extra features	Heart-rate sensor, fingerprint scanner	Waterproof, PS4 Remote Play	24-bit/192kHz audio, rear key	24-bit/192kHz audio, rear key	BoomSound speakers
Geekbench 3.0 (single)	1347	Not tested	Not tested	Not tested	1160
Geekbench 3.0 (multi)	4438	2800	3513	2465	3378
SunSpider	1048ms	944ms	715ms	959ms	867ms
GFXBench: T-Rex	30fps	41fps	25fps	20fps	50fps
GFXBench: Manhattan	14fps	26fps	9fps	Not tested	24fps
Battery	2550mAh, non-removable	2600mAh, non-removable	3000mAh removable	3000mAh, removable, Qi	2840mAh, non-removable
Dimensions	143.4x70.5x6.8mm	64.9x127x8.6mm	64.9x127x8.6mm	75x146x8.9mm	70x145x9.7mm
Weight	138g	129g	155g	149g	157g
Warranty	1 year	2 years	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PC2KOYQ	TINYURL.COM/NBBUY82	TINYURL.COM/NBBUY82	TINYURL.COM/OA76T73	TINYURL.COM/PUS2XEJ





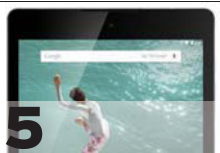
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Best budget smartphones	1	2	3	4	5
	Motorola Moto G 3G 2014	Motorola Moto E 4G 2015	Motorola Moto G 4G 2014	Motorola Moto G 4G 2015	Microsoft Lumia 640
Price	£140 inc VAT	£109 inc VAT	£117 inc VAT	£149 inc VAT	£129 inc VAT
Website	Motorola.co.uk	Motorola.co.uk	Motorola.co.uk	Motorola.co.uk	Microsoft.com/en-gb
Launch date	Sep 14	Feb 15	May 14	Mar 15	May 15
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 4.4 KitKat	Android 5.0 Lollipop	Android 4.4 KitKat	Android 5.0 Lollipop	Windows Phone 8.1
Processor	1.2GHz Snapdragon 400	1.2GHz Snapdragon 410	1.2GHz Snapdragon 400	1.2GHz Snapdragon 400	1.2GHz Snapdragon 400
RAM	1GB	1GB	1GB	1GB	1GB
Storage	8GB	8GB	8GB	8GB	8GB
MicroSD support	Up to 32GB	Up to 32GB	Up to 32GB	Up to 32GB	Up to 128GB
Graphics	Adreno 305	Adreno 306	Adreno 305	Adreno 305	Adreno 305
Screen size	5in	4.5in	4.5in	5in	5in
Screen resolution	720x1280	540x960	720x1280	720x1280	1280x720
Pixel density	294ppi	245ppi	326ppi	294ppi	294ppi
Screen technology	IPS	IPS	IPS	IPS	IPS
Front camera	2Mp	0.3Mp	1.3Mp	2Mp	0.9Mp
Rear camera	8Mp, LED flash	5Mp	5Mp, LED flash	8Mp, LED flash	8Mp, LED flash
Video recording	720p	720p	720p	720p	1080p
Cellular connectivity	3G	4G	4G	4G	4G
SIM type	Micro-SIM	Micro-SIM	Micro-SIM	Micro-SIM	Micro-SIM
Dual-SIM as standard	Yes	No	No	No	No
Wi-Fi	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
GPS	A-GPS, Glonass	GPS, A-GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass
NFC	No	No	No	No	No
USB OTG	Yes	No	Yes	Yes	Yes
Extra features	Stereo speakers	Double-twist launches camera, lockscreen alerts	None	Stereo speakers	Here Drive+, Here Maps, MixRadio, FM Radio
Geekbench 3.0 (single)	340	464	334	345	Not tested
Geekbench 3.0 (multi)	1144	1463	1168	1182	Not tested
SunSpider	1526ms	1301ms	1504ms	1968ms	1201ms
GFXBench: T-Rex	11fps	13fps	11fps	11fps	7.5fps
GFXBench: Manhattan	4fps	6fps	Not tested	4fps	Not tested
Battery	2390mAh, non-removable	2390mAh, non-removable	2070mAh, non-removable	2390mAh, non-removable	2500mAh, removable
Dimensions	71x142x11mm	66.8x5.2-12.3x129.9mm	66x130x11.6mm	71x142x11mm	72.2x8.8x141.3mm
Weight	155g	145g	143g	155g	145g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OAE6AH5	TINYURL.COM/Q7Q9NXR	TINYURL.COM/Q7Q9NXR	TINYURL.COM/Q9RQCKU	TINYURL.COM/NWGSHE

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Best phablets	1	2	3	4	5
	PC ADVISOR RECOMMENDED	PC ADVISOR GOLD	PC ADVISOR GOLD		PC ADVISOR RECOMMENDED
	Samsung Galaxy Note 4	LG G3	OnePlus One	Google Nexus 6	Apple iPhone 6 Plus
Price	£599 inc VAT	£479 inc VAT	£229 inc VAT	£499 inc VAT	£619 inc VAT
Website	Samsung.com/uk	Lg.com/uk	Oneplus.net	Play.google.com	Apple.com/uk
Launch date	Sep 14	May 14	Jul 14	Oct 14	Sep 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 4.4 KitKat	Android 4.4 KitKat	Cyanogen 11S (Android 4.4)	Android 5.0 Lollipop	iOS 8
Processor	2.7GHz Snapdragon 805	2.5GHz Snapdragon 801	2.5GHz Snapdragon 801	2.7GHz Snapdragon 805	Apple A8
RAM	3GB	2GB/3GB	3GB	3GB	1GB
Storage	32GB	16GB/32GB	16GB/64GB	32GB/64GB	16GB/64GB/128GB
MicroSD support	Up to 128GB	No	No	No	No
Graphics	Adreno 420	Adreno 330	Adreno 330	Adreno 420	Apple M8
Screen size	5.7in	5.5in	5.5in	5.96in	5.5in
Screen resolution	1440x2560	1440x2560	1920x1080	1440x2560	1920x1080
Pixel density	515ppi	534ppi	401ppi	493ppi	401ppi
Screen technology	Super AMOLED	IPS	IPS	IPS	IPS
Front camera	3.7Mp	2Mp	5Mp	2Mp	1.2Mp
Rear camera	16Mp, LED flash	13Mp, LED flash	13Mp, LED flash	13Mp, LED flash	8Mp, LED flash
Video recording	4K	4K	4K	4K	1080p
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Micro-SIM	Micro-SIM	Micro-SIM	Nano-SIM	Nano-SIM
Dual-SIM as standard	No	No	No	No	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.1	Bluetooth 4.0 (aptX)	Bluetooth 4.0	Bluetooth 4.1	Bluetooth 4.0
GPS	GPS, Glonass	A-GPS, Glonass	GPS, Glonass	GPS, Glonass	GPS, Glonass
NFC	Yes	Yes	Yes	Yes	Yes, but only for Apple Pay
USB OTG	Yes	Yes	Yes	Yes	No
Extra features	Fingerprint, UV, heart-rate sensors, S Pen stylus	24bit/192kHz audio, rear key	None	None	TouchID fingerprint scanner
Geekbench 3.0 (single)	Not tested	Not tested	969	Not tested	Not tested
Geekbench 3.0 (multi)	3272	2465	2570	3304	2917
SunSpider	1367ms	959ms	877ms	791ms	369ms
GFXBench: T-Rex	27fps	20fps	29fps	27fps	41fps
GFXBench: Manhattan	11fps	Not tested	Not tested	12fps	19fps
Battery	3220mAh, removable	3000mAh, removable, Qi	3100mAh, non-removable	3220mAh, non-removable, Qi	2915mAh, non-removable
Dimensions	78.6x153.5x8.5mm	75x146x8.9mm	75.9x152.9x8.9mm	82x159x10.4mm	77.8x158.1x7.1mm
Weight	176g	149g	162g	183g	172g
Warranty	2 years	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PNHJCZ4	TINYURL.COM/OA76T73	TINYURL.COM/PK3S5CP	TINYURL.COM/NLZ4UD9	TINYURL.COM/O9RX9UN






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Best 7- & 8in tablets						
		1	2	3	4	5
		PC ADVISOR GOLD	PC ADVISOR GOLD	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED	
		Google Nexus 7	Samsung Galaxy Tab S 8.4	Sony Xperia Z3 Tablet Compact	Apple iPad mini 2	Google Nexus 9
Price		£199 inc VAT	£319 inc VAT	£299 inc VAT	£239 inc VAT	£319 inc VAT
Website		Play.google.com	Samsung.com/uk	Sony.co.uk	Apple.com/uk	Play.google.com
Launch date		Aug 13	Aug 14	Sep 14	Oct 13	Oct 14
Build rating		★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating		★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating		★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating		★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating		★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
OS (out of box)		Android 4.3 Jelly Bean	Android 4.4 KitKat	Android 4.4 KitKat	iOS 8.2	Android 5.0 Lollipop
Processor		1.5GHz Snapdragon S4 Pro	Exynos 5420, octa-core	2.5GHz Snapdragon 801	Apple A7, Apple M7	2.3GHz nVidia Tegra K1
RAM		2GB	3GB	3GB	1GB	2GB
Storage		16GB/32GB	16GB/32GB	16GB/32GB	16GB/32GB	16GB/32GB
MicroSD support		No	Up to 128GB	Up to 128GB	No	No
Graphics		Adreno 320	ARM Mali-T628 MP6	Adreno 330	Apple A7	192-core Kepler
Screen size		7in	8.4in	8in	7.9in	8.9in
Screen resolution		1920x1200	2560x1440	1920x1200	2048x1536	2048x1536
Pixel density		323ppi	359ppi	283ppi	326ppi	287ppi
Screen technology		IPS	Super AMOLED	IPS	IPS	IPS
Front camera		1.2Mp	2.1Mp	2.2Mp	1.2Mp	1.6Mp
Rear camera		5Mp	8Mp, LED flash	8.1Mp	5Mp	8Mp, LED flash
Video recording		1080p	1080p	1080p	1080p	1080p
Cellular connectivity		4G version available	4G version available	4G version available	4G version available	4G version available
Wi-Fi		802.11b/g/n, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth		Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.1
GPS		GPS, Glonass	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC		Yes	No	Yes	No	Yes
USB OTG		Yes	Yes	Yes	No	Yes
Fingerprint scanner		No	Yes	No	No	No
Waterproof		No	No	Yes	No	No
Extra features		None	Stereo speakers	PS4 Remote Play, stereo speakers	None	BoomSound speakers
Geekbench 3.0 (single)		Not tested	Not tested	Not tested	Not tested	1904
Geekbench 3.0 (multi)		Not tested	2765	2708	Not tested	3352
SunSpider		1136ms	1089ms	1017ms	397ms	955ms
GFXBench: T-Rex		Not tested	14fps	28fps	Not tested	48fps
GFXBench: Manhattan		Not tested	3fps	11fps	Not tested	22fps
Battery		3950mAh, non-removable, Qi	4900mAh, non-removable	4500mAh, non-removable	6470mAh, non-removable	6700mAh, non-removable
Dimensions		200x114x8.65mm	126x213x6.6mm	213x124x6.4mm	134.7x7.5x200mm	153.7x228.3x8mm
Weight		299g	294g	270g	331g	425g
Warranty		1 year	1 year	1 year	1 year	1 year
FULL REVIEW		TINYURL.COM/PUJDJBY	TINYURL.COM/OUEM64Z	TINYURL.COM/NJ6VHEO	TINYURL.COM/PCJPB5L	TINYURL.COM/NQ6K77Y

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Best 9- & 10in tablets	 1 PC ADVISOR GOLD	 2 PC ADVISOR RECOMMENDED	 3 PC ADVISOR RECOMMENDED	 4 PC ADVISOR RECOMMENDED	 5 PC ADVISOR RECOMMENDED
	Apple iPad Air 2	Samsung Galaxy Tab S 10.5	Sony Xperia Z2 Tablet	Apple iPad Air	Google Nexus 10
Price	£399 inc VAT	£399 inc VAT	£369 inc VAT	£319 inc VAT	£389 inc VAT
Website	Apple.com/uk	Samsung.com/uk	Sony.co.uk	Apple.com/uk	Play.google.com
Launch date	Oct 14	Aug 14	Mar 14	Oct 13	Oct 12
Build rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	iOS 8.2	Android 4.4 KitKat	Android 4.4 KitKat	iOS 8.2	Android 4.2 Jelly Bean
Processor	Apple A8X, Apple M8	Exynos 5420, octa-core	2.3GHz Snapdragon 801	Apple A7, Apple M7	1.7GHz Exynos 5250
RAM	2GB	3GB	3GB	1GB	2GB
Storage	16GB/64GB/128GB	16GB/32GB	16GB	16GB/32GB	16GB/32GB
MicroSD support	No	Up to 128GB	Up to 64GB	No	No
Graphics	Apple A8X	ARM Mali-T628 MP6	Adreno 330	Apple A7	ARM Mali T604
Screen size	9.7in	10.5in	10.1in	9.7in	10.1in
Screen resolution	2048x1536	2560x1600	1920x1200	2048x1536	2560x1600
Pixel density	264ppi	288ppi	224ppi	264ppi	300ppi
Screen technology	IPS	Super AMOLED	IPS	IPS	IPS
Front camera	1.2Mp	2.1Mp	2.2Mp	1.2Mp	1.9Mp
Rear camera	8Mp	8Mp, LED flash	8.1Mp	5Mp	5Mp, LED flash
Video recording	1080p	1080p	1080p	1080p	1080p
Cellular connectivity	4G version available	4G version available	4G version available	4G version available	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n, dual-band	802.11b/g/n, dual-band
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
GPS	A-GPS, Glonass	GPS, Glonass	GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	Yes (for Apple Pay)	No	Yes	No	Yes
USB OTG	No	Yes	Yes	No	Yes
Fingerprint scanner	Yes	Yes	No	No	No
Waterproof	No	No	Yes	No	No
Extra features	None	Stereo speakers	PlayStation certified	None	None
Geekbench 3.0 (single)	1816	Not tested	967	1487	Not tested
Geekbench 3.0 (multi)	4523	2769	2719	2703	Not tested
SunSpider	Not tested	1079ms	1099ms	400ms	1329ms
GFXBench: T-Rex	48fps	14fps	27fps	23fps	Not tested
GFXBench: Manhattan	Not tested	3fps	Not tested	Not tested	Not tested
Battery	7340mAh, non-removable	7900mAh, non-removable	6000mAh, non-removable	8600mAh, non-removable	9000mAh, non-removable
Dimensions	240x169.5x6.1mm	247x177x6.6mm	266x172x6.4mm	240x169x7.5mm	264x178x8.9mm
Weight	437g	465g	439g	469g	603g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PLQXWSZ	TINYURL.COM/OESDFZQ	TINYURL.COM/M8BZZUN	TINYURL.COM/NVOO6FH	TINYURL.COM/PUAG9RN








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Best smartwatches					
	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4 PC ADVISOR RECOMMENDED	5 PC ADVISOR RECOMMENDED
	LG G Watch R	Motorola Moto 360	Sony Smartwatch 3	Asus ZenWatch	LG G Watch
Price	£195 inc VAT	£199 inc VAT	£189 inc VAT	£199 inc VAT	£159 inc VAT
Website	Lg.com/uk	Motorola.co.uk	Sony.co.uk	Uk.asus.com	Lg.com/uk
Launch date	Nov 14	Oct 14	Sep 14	Jan 15	Jul 14
Overall rating	★★★★★	★★★★★	★★★★☆	★★★★☆	★★★★☆
Operating system	Android Wear	Android Wear	Android Wear	Android Wear	Android Wear
Compatibility	Android	Android	Android	Android	Android
Display	1.3in 320x320 P-OLED	1.56in 290x320 LCD	1.6in 320x320 LCD	1.6in 320x320 AMOLED	1.65in 280x280 IPS
Processor	1.2GHz Snapdrgon 400	Ti OMAP 3	1.2GHz ARM V7	1.2GHz Snapdragon 400	1.2GHz Snapdragon 400
RAM	512MB	512MB	512MB	512MB	512MB
Storage	4GB	4GB	4GB	4GB	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	410mAh	320mAh	420mAh	1.4Wh	400mAh
Dimensions	46.4x53.6x9.7mm	46x11.5mm	36x51x10mm	51 x39.9x7.9-9.4mm	37.9x46.5x9.95mm
Weight	62g	49g (leather band model)	45g	75g	63g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/QATY8FT	TINYURL.COM/O9C69K6	TINYURL.COM/OQVZ3PN	TINYURL.COM/NN7GA7W	TINYURL.COM/Q84WL6L






Best smartwatches					
	6 PC ADVISOR RECOMMENDED	7 PC ADVISOR RECOMMENDED	8 PC ADVISOR RECOMMENDED	9 PC ADVISOR RECOMMENDED	10 PC ADVISOR RECOMMENDED
	Pebble Steel	Sony Smartwatch 2	Samsung Gear 2 Neo	Martian Notifier	Samsung Gear 2
Price	£179 inc VAT	£125 inc VAT	£169 inc VAT	£99 inc VAT	£260 inc VAT
Website	Getpebble.com	Sony.co.uk	Samsung.com/uk	Martianwatches.com	Samsung.com/uk
Launch date	Sep 14	Jun 13	Apr 14	Dec 14	Apr 14
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Operating system	Proprietary	Proprietary	Tizen	Proprietary	Tizen
Compatibility	iOS, Android	Android	Samsung phones	iOS, Android	Samsung phones
Display	1.26in 144x168 E-Paper	1.6in 220x176 LCD	1.6in 320x320 Super AMOLED	1.01in 96x16 OLED	1.6in 320x320 Super AMOLED
Processor	Not specified	Not specified	Dual-core	Not specified	1GHz dual-core
RAM	512MB	Not specified	512MB	Not specified	512MB
Storage	Not specified	Not specified	4GB	Not specified	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	130mAh	Not specified	300mAh	Not specified	300mAh
Dimensions	46x34x10.5mm	42x41x9mm	58.8x37.9x10mm	43x43x12.7mm	36.9x58.4x10mm
Weight	156g	123g	55g	52g	68g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PPBXV7J	TINYURL.COM/P4X7AZM	TINYURL.COM/Q68FS5U	TINYURL.COM/NS9E8GK	TINYURL.COM/QXCZ8J3




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Best activity trackers					
	1 	2	3 	4 	5
	Fitbit Charge HR	Fitbit Surge	Fitbit Charge	Fitbit One	Microsoft Band
Price	£119 inc VAT	£199 inc VAT	£99 inc VAT	£79 inc VAT	£169 inc VAT
Website	Fitbit.com/uk	Fitbit.com/uk	Fitbit.com/uk	Fitbit.com/uk	Microsoft.com/en-gb
Launch date	Jan 15	Jan 15	Nov 14	Jan 14	May 15
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Compatibility	iOS, Android, Windows	iOS, Android, Windows	iOS, Android, Windows	iOS, Android	iOS, Android, Windows
Display	OLED	Touchscreen	OLED	OLED	TFT
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	Yes	No	No	Yes
Sleep tracking	Yes	Yes	Yes	Yes	Yes
Alarm	Yes	Yes	Yes	Yes	Yes
Third-party app syncing	Yes	Yes	Yes	Yes	Yes
Call notifications	Yes	Yes	Yes	No	Yes
Waterproof	Yes	Yes	Yes	No	Yes
Battery life	5+ days	5 days	7-10 days	10-14 days	2 days
Dimensions, weight	21.1mm, 26g	34mm, 51g	21.1mm, 24g	35.5x28x9.65mm, 8g	11x33mm, 60g
FULL REVIEW	TINYURL.COM/PCKV4SU	TINYURL.COM/O83DR47	TINYURL.COM/PFMQ9KH	TINYURL.COM/PT2TC6F	TINYURL.COM/LHMQ2AC






Best activity trackers					
	6	7 	8 	9	10
	Basis Peak	Xiaomi Mi Band	Jawbone Up Move	Jawbone Up24	Misfit Flash
Price	£169 inc VAT	£29 inc VAT	£39 inc VAT	£99 inc VAT	£49 inc VAT
Website	En-gb.mybasis.com	Mobilefun.co.uk	Jawbone.com	Jawbone.com	Misfit.com
Launch date	Apr 15	Feb 15	Nov 14	Mar 14	Sep 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Compatibility	iOS, Android	iOS, Android	iOS, Android	iOS, Android	iOS, Android
Display	E-Ink	No	No	No	No
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	No	No	No	No
Sleep tracking	Yes	Yes	Yes	Yes	Yes
Alarm	No	Yes	No	Yes	Yes
Third-party app syncing	No	No	Yes	Yes	Yes
Call notifications	Yes	Yes	No	No	No
Waterproof	Yes	Yes	Splashproof	Splashproof	Yes
Battery life	4 days	30 days	Six months, non-rechargeable	7 days	Six months, non-rechargeable
Dimensions, weight	33x43x10mm, 51g	157-205mm, 13g	27.6x27.6x9.8mm, 6.8g	S: 19g, M: 22g, L: 23g	28.5x8.0x28.5mm, 6g
FULL REVIEW	TINYURL.COM/LHMQ2AC	TINYURL.COM/QZ3YVCR	TINYURL.COM/PFXQFNE	TINYURL.COM/ND8YMB8	TINYURL.COM/NPZ3B9E






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Best budget printers	1	2	3	4	5
					
	Samsung Xpress M2070W	Canon Pixma MG5550	Canon i-Sensys LBP6230dw	Samsung Xpress M2022W	Canon Pixma MX535
Price	£100 inc VAT	£60 inc VAT	£91 inc VAT	£68 inc VAT	£70 inc VAT
Website	Samsung.com/uk	Canon.co.uk	Canon.co.uk	Samsung.com/uk	Canon.co.uk
Launch date	Mar 14	Apr 14	Mar 15	Aug 14	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Mono laser	Colour inkjet	Mono laser	Mono laser	Colour inkjet
Max print resolution	1200x1200	4800x1200dpi	1200x1200dpi	1200x1200dpi	4800x1200dpi
Actual print speed	B=17.1ppm	B=11.8ppm C=8.7ppm	B=22.2ppm	B=18ppm	B=9.7ppm C=3.8ppm
Scan/fax facilities	1200x1200 scans	1200x2400 scans	None	None	1200x2400 scans/fax
Supported interfaces	USB 2.0, 802.11b/g/n, NFC	USB 2.0, 802.11b/g/n	USB 2.0, 802.11b/g/n	USB 2.0, 802.11b/g/n	USB 2.0, 802.11b/g/n, AirPrint
Cost per page	B=3.8p	B=2.4p C=4.8p	B=2p	B=5p	B=2.7p C=4.8p
Media card/auto duplex	xx	x✓	x✓	xx	x✓
Input capacity	150 sheets	100 sheets	250 sheets	150 sheets	100 sheets + 30-sheet ADF
Dimensions	406x360x253mm	455x369x148mm	379x293x243mm	332x215x178mm	458x385x200mm
Weight	7.4kg	6.3kg	7kg	4kg	8.5kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OYZKJKE	TINYURL.COM/LKWLJDE	TINYURL.COM/KZW8VU3	TINYURL.COM/NFJHDOR	TINYURL.COM/N9LXV7

Best printers	1	2	3	4	5
					
	Epson WorkForce Pro	Canon i-Sensys MF6180dw	Epson Ecotank L555	Brother HL-L9200CDWT	HP OfficeJet Pro X551dw
Price	£200 inc VAT	£320 inc VAT	£330 inc VAT	£548 inc VAT	£275 inc VAT
Website	Epson.co.uk	Canon.co.uk	Epson.co.uk	Brother.co.uk	Hp.com/uk
Launch date	May 15	May 14	Jan 15	Aug 14	Aug 13
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Colour inkjet	Mono laser	Colour inkjet	Colour laser	Colour inkjet
Max print resolution	4800x1200dpi	1200x600dpi	5760x1440dpi	2400x600dpi	2400x2400
Actual print speed	B=18.9ppm	B=24ppm	B=8.5ppm C=4ppm	B=30ppm C=30ppm	B=42.9ppm C=15.8ppm
Scan/fax facilities	None	600dpi scanner, 33.6Kb/s fax	1200dpi scanner, 33.6Kb/s fax	None	None
Supported interfaces	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n
Cost per page	B=1.1p	B=1.5p	B=0.2p C=0.4p	B=1p C=5.9p	B=1p C=4.3p
Media card/auto duplex	x✓	x✓	xx	x✓	x✓
Input capacity	250 + 80 sheet	250 + 50 sheet + 50 ADF	100 + 30 sheet	750 sheets + 50 sheet	500 + 50 sheet
Dimensions	346x442x284mm	390x473x431mm	474x377x226mm	410x495x445mm	517x399x414mm
Weight	11.4kg	19.1kg	6.2kg	28.3kg	17.1kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OC7FUJ3	TINYURL.COM/LE9WA5N	TINYURL.COM/N8NS5QL	TINYURL.COM/PT52MH6	TINYURL.COM/CZ05P65

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Best wireless routers	    				
	1	2	3	4	5
	Apple AirPort Extreme	Netgear Nighthawk R7000	D-Link DIR 880L	TP-Link Archer C7	Asus RT-AC68U AC1900
Price	£169 inc VAT	£150 inc VAT	£108 inc VAT	£90 inc VAT	£160 inc VAT
Website	Apple.com/uk	Netgear.co.uk	Dlink.com	Tp-link.com	Uk.asus.com
Launch date	Jan 14	Sep 14	Sep 14	Jan 14	Jan 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Standards supported	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac
Frequency modes	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)
Antennas	6x internal	3x external	3x external	3x external, 3x internal	3x external, 3x internal
Built-in modem	×	×	×	×	×
Manufacturer's rating	1300/450Mb/s	1300/600Mb/s	1300/600Mb/s	1300/450Mb/s	1300/600Mb/s
WPS	×	✓	✓	✓	✓
Ports	Gigabit WAN, 3x gigabit LAN, USB	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	Gigabit WAN, 4x gigabit LAN, 2x USB 2.0	Gigabit WAN, 4x gigabit LAN, 2x USB 2.0
Average power use	8W	9W	10W	N/A	N/A
Max speed (11n/11ac)	171/572Mb/s	171/592Mb/s	171/625Mb/s	110/505Mb/s	98/610Mb/s
Dimensions, weight	98x168x98mm, 945g	285x186x45mm, 750g	247x190x47mm, 745g	32.5x243x160mm, 508g	160x83x220mm, 640g
Warranty	1 year	N/S	N/S	3 years	2 years
FULL REVIEW	TINYURL.COM/MFDLLSC	TINYURL.COM/Q2NRQ8Q	TINYURL.COM/OZ5G7KG	TINYURL.COM/KKJMPCE	TINYURL.COM/K4ZATKV

Best powerline adaptors	    				
	1	2	3	4	5
	Solwise SmartLink 1200AV2	TrendNet Powerline 500 AV2	Devol dLan 1200+	TP-Link AV1200	TP-Link TL-WPA4230P
Price	£43 inc VAT	£41 inc VAT	£119 inc VAT	£88 inc VAT	£88 inc VAT
Website	Solwise.com	Trendnet.com	Devol.com/uk	Uk.tp-link.com	Uk.tp-link.com
Launch date	Nov 14	Mar 14	Sep 14	May 15	Apr 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
No of adaptors in kit	1 (2 required)	2	2	2	2
Max throughput	1200Mb/s	600Mb/s	1200Mb/s	1200Mb/s	500Mb/s
Near test result	410Mb/s	146Mb/s	357Mb/s	500Mb/s	100Mb/s
Far test result	107Mb/s	71Mb/s	126Mb/s	200Mb/s	65Mb/s
Ethernet ports	2x gigabit	1x gigabit	1x gigabit	1x gigabit	3x fast
Passthrough socket	Yes	No	Yes	Yes	Yes
Wireless hotspot	No	No	No	No	Yes
Encryption	128-bit	128-bit	128-bit	128-bit	128-bit
Dimensions	62x122x41mm	55x87x58mm	130x66x42mm	230x190x100mm	126x64x42mm
Weight	Not specified	90g	Not specified	898g	Not specified
Warranty	2 years	3 years	3 years	1 year	1 year
FULL REVIEW	TINYURL.COM/NZ4EJW8	TINYURL.COM/QYEPJQ7	TINYURL.COM/Q4EOO4M	TINYURL.COM/NVONCWT	TINYURL.COM/NKWAVP9

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Best NAS drives	1	2	3	4	5
	Qnap TS-421	Synology DS115j	Qnap HS-210	WD My Cloud EX2100	Synology DS414j
Price	£320 inc VAT (diskless)	£83 inc VAT (diskless)	£190 inc VAT (diskless)	£205 inc VAT (diskless)	£270 inc VAT (diskless)
Website	Qnap.com	Synology.com	Qnap.com	Wd.com	Synology.com
Launch date	Mar 14	Feb 15	Dec 14	May 15	Jan 15
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Drive bays	4	1	2	2	4
Processor	2GHz Marvell single-core	800MHz Marvell Armada 370	1.6GHz Marvell single-core	1.3 GHz Marvel Armada 385	1.2GHz Mindspeed Concerto
Memory	1GB DDR3	256MB DDR3	512MB DDR3	1GB DDR3	512MB DDR3
Remote access	✓	✓	✓	✓	✓
eSATA	2x	x	x	x	1x
USB port	2x USB 3.0, 2x USB 2.0	2x USB 2.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0	1x USB 3.0, 1x USB 2.0
Raid options	0/1/5/6/10/JBOD	None	0/1/JBOD	00/1/JBOD	0/1/5/6/10/JBOD
Software	Backup Station	DSM 5.1	HD Station	My Cloud	DSM 5.0
Dimensions	177x180x235mm	71x161x224mm	302x220x41mm	216x109x148mm	184x168x230mm
Weight	3kg	700g	1.5kg	3.5kg	2.2kg
Warranty	2 years	1 year	2 years	3 years	3 years
FULL REVIEW	TINYURL.COM/MCYWUB8	TINYURL.COM/MNEYVVK	TINYURL.COM/OEXRYNY	TINYURL.COM/M643BSG	TINYURL.COM/M643BSG

Best external hard drives	1	2	3	4	5
	Transcend StoreJet 25M3	Toshiba Canvio Basics	WD My Passport Ultra Metal	Seagate Seven mm	iStorage diskAshur Pro
Price	£70 inc VAT	£76 inc VAT	£90 inc VAT	£99 inc VAT	£269 inc VAT
Website	Uk.transcend-info.com	Toshiba.co.uk	Wdc.com/en	Seagate.com/gb/en	Istorage-uk.com
Launch date	Feb 15	Feb 15	Feb 15	Feb 15	Feb 15
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Capacity tested	2TB	2TB	2TB	500GB	1TB
Capacity range	500GB, 1TB, 2TB	500GB, 1TB, 2TB	1TB, 2TB	500GB	500GB, 1TB, 1.5TB, 2TB
Disk size	2.5in	2.5in	2.5in	2.5in	2.5in
Spin speed	5400rpm	5400rpm	N/A	5400rpm	5400rpm
Transfer speed	135MB/s	117MB/s	114MB/s	49MB/s	115MB/s
Encryption	256-bit AES	256-bit AES	256-bit AES	N/A	256bit AES-XTS
Other interfaces	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0
Software	Transcend Elite	None	WD Drive Utilities	Seagate Dashboard	Security utilities
Dimensions	130x82x19mm	111x79x21mm	110x80x19mm	123x82x7mm	120x85x20mm
Weight	234g	207g	241g	178g	200g
Warranty	3 years	2 years	3 years	2 years	2 years
FULL REVIEW	TINYURL.COM/M72D3EP	TINYURL.COM/JWHHACB	TINYURL.COM/L2B7V3B	TINYURL.COM/O6KZFDM	TINYURL.COM/MZ0BZ6J

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Best SSDs					
	1	2	3	4	5
	Crucial M550	OCZ Vector 150	Crucial M500	Samsung 840 EVO	Seagate 600 SSD
Price	£338 inc VAT	£125 inc VAT	£155 inc VAT	£320 inc VAT	£202 inc VAT
Website	Crucial.com/uk	Ocz.com	Crucial.com/uk	Samsung.com/uk	Seagate.com/gb
Launch date	May 14	May 14	Aug 13	Nov 13	May 14
Overall rating	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆
Capacity tested	1TB	240GB	480GB	750GB	480GB
Price per GB	34p	52p	32p	43p	43p
Memory cache	1GB LP DDR2	512MB	512MB DDR3	1GB LPDDR2	N/A
Controller	Marvell 88SS9189	Indilinx Barefoot 3 M00	Marvell 88SS9187	Samsung MEX (3-core ARM)	Link A Media Device
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	AES 256-bit	None
Flash	Micron 20nm MLC NAND	Toshiba 19nm MLC	Micron 20nm MLC NAND	Samsung 19nm Toggle NAND	Toshiba 19nm MLC
Firmware updated via	Bootable CD	OCZ Toolbox, bootable	ISO boot disc	SSD Magician for Windows	Seagate Firmware, bootable
ATTO peak sequential	R: 563MB/s; W: 514MB/s	R: 557MB/s; W: 534MB/s	R: 539MB/s; W: 433MB/s	R: 554MB/s; W: 537MB/s	R: 555MB/s; W: 474MB/s
CDM peak IOPS	100 / 91.7	92.9 / 94.7	89.8k (read)	104K (read)	96.8 / 88.6
CDM 4kB rnd	30/99	25/97	N/A	N/A	28/78
Warranty	3 years	5 years or 91TB writes	3 years	5 years	3 years
FULL REVIEW	TINYURL.COM/MSWD98Z	TINYURL.COM/KBED2W6	TINYURL.COM/M2NCSMJ	TINYURL.COM/L5EDQOY	TINYURL.COM/N58RB8G






Best projectors					
	1	2	3	4	5
	ViewSonic PLED-W800	BenQ W1300	Optoma W316	InFocus IN126STa	NEC M352WS
Price	£512 inc VAT	£730 inc VAT	£458 inc VAT	£525 inc VAT	£778 inc VAT
Website	Viewsoniceurope.com/uk	Benq.co.uk	Optoma.co.uk	Infocus.com	Nec-display-solutions.com
Launch date	Feb 15	Jun 14	Jul 14	Sep 14	Jul 14
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Projection technology	DLP	DLP	DLP	DLP	DLP
Resolution (pixels)	1280x800	1920x1080	1280x800	1280x800	1280x800
Brightness, Contrast	800, 120,000:1	2000, 10,000:1	3400, 15,000:1	3300, 15,000:1	3500, 10,000:1
Image size	100in	300in	300in	300in	150in
Supported aspect ratios	16:10 native	16:9 native	16:10, 16:9, 4:3	16:10, 16:9, 4:3	16:10
Noise levels (dB)	34 (32 eco)	33 (30 eco)	29db	32db (30 eco)	33 (39 bright mode)
Connections	VGA, HDMI, USB	VGA, 2x HDMI, USB, 3D	VGA, HDMI, Mini-USB, 3D	2x VGA, HDMI, USB, ethernet	2x VGA, 2x HDMI, USB
Lamp/lamp life	90W/30000 hrs	240W/6000 hrs	190W/10000 hrs	278W/3500 hrs	278W/8000 hrs
Dimensions	175x52x138mm	330x257x128mm	315x223x102mm	292x220x108mm	368x268x97mm
Weight	0.83kg	3.4kg	2.5kg	3.7kg	3.6kg
Warranty	3 years	3 years	2 years	1 year	3 years
FULL REVIEW	TINYURL.COM/K83X8LA	TINYURL.COM/K4FA89Q	TINYURL.COM/OCWTHGW	TINYURL.COM/NHH3QPB	TINYURL.COM/Q6J2N6W






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Best budget graphics cards	1	2	3	4	5
	MSI Radeon R9 270X	MSI Radeon R9 270 Gaming Ed	MSI R7 260X OC	XFX Radeon R7-265	Gigabyte GTX 750 Ti
Price	£130 inc VAT	£125 inc VAT	£91 inc VAT	£110 inc VAT	£120 inc VAT
Website	Uk.msi.com	Uk.msi.com	Uk.msi.com	Sapphiretech.com	Uk.gigabyte.com
Launch date	Dec 13	Jul 14	May 14	Sep 14	Aug 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	AMD Radeon R9 270X	AMD Radeon R9 270	AMD Radeon R7 260X	AMD Radeon R7 265	nVidia GeForce GTX 750 Ti
Installed RAM	2GB GDDR5	2GB GDDR5	2GB GDDR5	2GB GDDR5	2GB GDDR5
Memory interface	256-bit	256-bit	128-bit	128-bit	128-bit
Core clock/boost	1030MHz/1120MHz	900MHz/975MHz	1175MHz/none	900MHz/925MHz	1033MHz/1111MHz
Memory clock/Effective	1.4/5.6GHz	1.4/5.6GHz	1625MHz/6.5GHz	1.4/5.6GHz	1.35/5.4GHz
Stream processors	1280	1280	896	Varies	640
Texture units	80	80	56	64	40
Power connectors	2x 6-pin	1x 6-pin	1x 6-pin	1x 6-pin	N/A
DirectX	11	11.2	11.1	11	11.2
Digital interface	2x DVI, HDMI, DisplayPort	2x DVI, HDMI, DP	2x DVI, HDMI, Mini-DP	2x DVI, 1x HDMI, 1x DP	2x DVI, 2x HDMI
Warranty	2 years	3 years	3 years	2 years	3 years
FULL REVIEW	TINYURL.COM/OYA2DFJ	TINYURL.COM/MCE7353	TINYURL.COM/OZ6WUYT	TINYURL.COM/LV69BEM	TINYURL.COM/Q7K4ESV

Best graphics cards	1	2	3	4	5
	Gigabyte GeForce GTX 770 2GB	Sapphire Radeon R9 280X	XFX Radeon R9 290X	Zotac GeForce GTX 960	MSI Radeon R9 295 X2
Price	£200 inc VAT	£200 inc VAT	£280 inc VAT	£285 inc VAT	£680 inc VAT
Website	Uk.gigabyte.com	Sapphiretech.com	Xfxforce.com	Zotac.com	Uk.msi.com
Launch date	Aug 13	Mar 14	Apr 14	Mar 15	May 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	nVidia GeForce GTX 770	AMD Radeon R9 280X	AMD Radeon R9 290X	nVidia GeForce GTX 960	AMD Radeon R9 295 X2
Installed RAM	2GB GDDR5	3GB GDDR5	4GB GDDR5	2GB GDDR5	8GB GDDR5
Memory interface	256-bit	384-bit	512-bit	128-bit	2x 512-bit
Core clock/boost	950/1020MHz	950/1070MHz	1/1GHz	1266/1329MHz	1018MHz/N/A
Memory clock/Effective	1.5GHz/6GHz	1.55GHz/6.2GHz	1.25GHz/5GHz	1752MHz/7.1GHz	1.25GHz/5GHz
Stream processors	1536	2048	2816	1024	2x 2816
Texture units	128	128	176	64	2x 176
Power connectors	1x 6-pin, 1x 8-pin	2x 8-pin	8-pin, 6-pin	1x 6-pin	2x 8-pin
DirectX	11	11	11	12	11
Digital interface	2x DVI, HDMI, DisplayPort	DVI, HDMI, 2x Mini-DisplayPort	2x DVI, HDMI, DisplayPort	DVI, HDMI, 3x DisplayPort	DVI, 4x Mini-DP
Warranty	3 years	2 years	3 years	5 years	3 years
FULL REVIEW	TINYURL.COM/OAG6277	TINYURL.COM/OWVAP37	TINYURL.COM/NPET8ER	TINYURL.COM/MWBC036	TINYURL.COM/POTAOGZ




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Best budget flat-panel displays					
	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
	AOC i2369V	Philips 234E5QHAW	NEC MultiSync E243WMI	BenQ EW2740L	BenQ GL2450
Price	£130 inc VAT	£130 inc VAT	£194 inc VAT	£175 inc VAT	£108 inc VAT
Website	Aoc-europe.com/en	Philips.co.uk	Nec-display-solutions.com	Benq.co.uk	Benq.co.uk
Launch date	Jul 14	Jul 14	Jun 14	Aug 14	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	23in	23in	23.8in	27in	24in
Panel type	IPS matt	IPS matt	IPS matt	VA semi-matt	TN matt
Native resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Pixel density	96ppi	96ppi	93ppi	82ppi	92ppi
Brightness	220cd/m ²	187cd/m ²	250cd/m ²	300cd/m ²	261cd/m ²
Static contrast ratio	630:1	210:1	650:1	280:1	610:1
Response time	6ms	5ms	6ms	4ms	5ms
Ports	HDMI, HDMI/MHL, DP, VGA	2x HDMI (QHAB) or 1x HDMI (QDAB), VGA	DP, DVI-D, VGA	2x HDMI, VGA	DVI-D, VGA
Dimensions	531x204x398mm	532x213x414mm	558x214x380-490mm	623x191x451mm	579x179x436mm
Weight	3.75kg	3.5kg	6.3kg	4.2kg	4.1kg
Warranty	3 years	2 years	3 years	2 years	2 years
FULL REVIEW	TINYURL.COM/OOEFYPR	TINYURL.COM/KLYLW4V	TINYURL.COM/KNCGVOU	TINYURL.COM/OO6EC5L	TINYURL.COM/OOUPFUE

Best flat-panel displays					
	1	2	3	4	5
	LG 34UM95	HP DreamColor Z27x	Dell UltraSharp 32 Ultra	BenQ PG2401PT	ViewSonic VP2772
Price	£760 inc VAT	£750 inc VAT	£1,455 inc VAT	£855 inc VAT	£540 inc VAT
Website	Lg.com/uk	hp.com/uk	Dell.co.uk	Benq.co.uk	Viewsoniceurope.com/uk
Launch date	Dec 14	Jan 15	Jun 14	Oct 14	Jun 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	34in 21:9	27in	31.5in	24.1in	27in
Panel type	IPS matt	AH-IPS	IGZO	IPS	AH-IPS
Native resolution	3440x1440	2560x1440	3840x2160	1920x1200	2560x1440
Pixel density	110ppi	109ppi	140ppi	94ppi	109ppi
Brightness	320cd/m ²	250cd/m ²	350cd/m ²	317cd/m ²	350cd/m ²
Static contrast ratio	1000:1	800:1	550:1	540:1	560:1
Response time	5ms	7ms	8ms	5ms	6ms
Ports	HDMI, DP, Thunderbolt, USB 3.0	HDMI, DP, USB 3.0, USB 2.0	HDMI, DP, Mini-DP, 4x USB 3.0	DVI, DP, HDMI, VGA, 3x USB 3.0	HDMI, DVI, Mini-DP, 4x USB 3.0
Dimensions	830x83x380mm	641x655x379mm	750x214x483-572mm	543x254x555mm	643x348x470mm
Weight	6.7kg	8.8kg	9.2kg	7kg	8.5kg
Warranty	2 years	3 years	3 years	1 year	3 years
FULL REVIEW	TINYURL.COM/QYKH6UM	TINYURL.COM/NKUF9EN	TINYURL.COM/O4CTO3S	TINYURL.COM/PMV5L5V	TINYURL.COM/LLQRWTX

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Best e-book readers






					
	1	2	3	4	5
	Amazon Kindle Voyage	Amazon Kindle (7th gen)	Amazon Kindle Paperwhite	Nook GlowLight	Kobo Aura H20
Price	£169 inc VAT	£59 inc VAT	£109 inc VAT	£89 inc VAT	£139 inc VAT
Website	Amazon.co.uk	Amazon.co.uk	Amazon.co.uk	Nook.com/gb	Kobo.com
Launch date	Oct 14	Sep 14	Sep 13	Oct 13	Sep 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	6in touchscreen	6in touchscreen	6in touchscreen	6in touchscreen	6.8in touchscreen
Screen technology	E Ink	E Ink	E Ink	E Ink	E Ink
Screen resolution	1440x1080	600x800	768x1024	758x1024	1430x1080
Built-in light	Yes	No	Yes	Yes	Yes
Storage	4GB	4GB	2GB	4GB	4GB, microSD up to 32GB
Book store	Amazon Kindle	Amazon Kindle	Amazon Kindle	Nook	Kobo
Cellular connectivity	Optional extra	No	Optional extra	No	No
Battery life	Six weeks	Four weeks	Eight weeks	Eight weeks	Two months
Dimensions	162x115x7.6mm	169x119x10.2mm	117x169x9.1mm	127x166x10.7mm	179x129x9.7mm
Weight	180g	191g	206g	175g	233g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NXAAU3Q	TINYURL.COM/NSFORJE	TINYURL.COM/PREZPRK	TINYURL.COM/OZ5WMPO	TINYURL.COM/MJVR4M9

Best media streamers



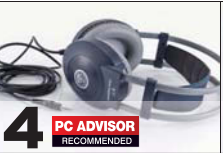

					
	1	2	3	4	5
	Roku Streaming Stick	Roku 3	Google Chromecast	Apple TV	Amazon Fire TV
Price	£49 inc VAT	£99 inc VAT	£30 inc VAT	£59 inc VAT	£79 inc VAT
Website	Roku.com	Roku.com	Play.google.com	Apple.com/uk	Amazon.co.uk
Launch date	Mar 14	Mar 13	Mar 14	Mar 12	Oct 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Type	Dongle	Set-top box	Dongle	Set-top box	Set-top box
Ports	HDMI, Micro-USB	HDMI, USB, ethernet	HDMI, Micro-USB	HDMI, ethernet, Micro-USB	HDMI, USB, ethernet
Processor	600MHz single-core	900MHz single-core	Single-core	Apple A5 single-core	1.7GHz Qualcomm quad-core
RAM	512MB	512MB	512MB	512MB	2GB
Graphics	Not specified	Not specified	Not specified	Not specified	Adreno 320
Storage	None	512MB plus microSD slot	None	8GB (not user-accessible)	8GB
Voice search	No	Yes	No	No	Yes
Remote control	Yes	Yes	No	Yes	Yes
Dimensions	78.7x27.9x12.7mm	89x89x25mm	72x35x12mm	98x98x23mm	115x115x17.5mm
Weight	18g	170g	34g	270g	281g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OAP9QF9	TINYURL.COM/PT7MGUL	TINYURL.COM/QBGTCS2	TINYURL.COM/OLCJRC3	TINYURL.COM/P4RE7WP






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Best games consoles					
	1	2	3	4	5
	Sony PlayStation 4	Microsoft Xbox One	Nintendo Wii U Premium	Sony PlayStation 3 Super Slim	Microsoft Xbox 360
Price	£349 inc VAT	£349 inc VAT	£249 inc VAT	£249 inc VAT	£199 inc VAT
Website	Playstation.com	Xbox.com	Nintendo.co.uk	Playstation .com	Xbox.com
Launch date	Nov 13	Nov 13	Nov 12	Sep 12	Dec 05
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	Octa-core AMD x86	1.75GHz octa-core AMD x86	IBM Power multicore CPU	IBM CPU	IBM Xenon CPU
Graphics	1.84TFlops AMD Radeon GPU	1.31TFlops AMD Radeon GPU	AMD Radeon GPU	256MB nVidia RSX	512MB ATI Xenos
RAM	8GB GDDR5	8GB DDR3	Not specified	Not specified	512MB GDDR3
Storage	500GB	500GB	32GB, plus SD card support	500GB	500GB
Optical drive	Blu-ray, DVD, game discs	Blu-ray, DVD, game discs	Wii U, Wii discs only	Blu-ray, DVD, game discs	DVD, game discs
Ports	2x USB 3.0, AUX, HDMI	USB 3.0, HDMI	4x USB 2.0, HDMI	2x USB 2.0, HDMI	5x USB, HDMI
Connectivity	Ethernet, 802.11b/g/n, Bluetooth	Ethernet, 802.11b/g/n	802.11b/g/n	Ethernet, 802.11b/g/n, Bluetooth	Ethernet, 802.11b/g/n
Other	1 controller	1 controller, 4K, Kinect option	1 controller	1 controller	1 controller
Dimensions	275x53x305mm	333x274x79mm	46x269x171mm	290x230x60mm	269x75x264mm
Weight	2.8kg	3.2kg	1.6kg	2.1kg	2.9kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NBFLQK2	TINYURL.COM/M6J4KHS	TINYURL.COM/6J49LHL	TINYURL.COM/QDJP560	TINYURL.COM/PFP9CCK






Best budget portable speakers					
	1	2	3	4	5
	Lumsing B9	i-box Twist	Lava BrightSounds	Denon Envaya Mini	iClever IC-BTS02
Price	£23 inc VAT	£41 inc VAT	£39 inc VAT	£99 inc VAT	£23 inc VAT
Website	Lumsing.com	Iboxstyle.com	Lavaaccessories.co.uk	Denon.com	Hisgadget.com
Launch date	Aug 14	Nov 12	Dec 14	Jan 15	Nov 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Speaker(s)	2x 3W	2x 3W	1x 5W	Not specified	1x 5W
Bluetooth	Bluetooth 3.0 + EDR	Bluetooth 2.1	Not specified	Bluetooth 4.0	Bluetooth 4.0
Handsfree calls	Yes	Yes	Yes	Yes	Yes
NFC	Yes	No	No	Yes	No
Frequency response	20Hz to 20kHz	Not specified	Not specified	Not specified	90Hz to 18kHz
Impedance	4 ohms	Not specified	Not specified	Not specified	Not specified
Extra features	MicroSD slot, lanyard	None	IPX4 splashproof, LED lamp	IPX4 splashproof	None
Claimed battery life	25 hours	5 hours	8 hours	10 hours	8-12 hours
Dimensions	177x50x70mm	246x59x56mm	190x95x103mm	209x54x51mmmm	64.5x64.5x70.1mm
Weight	300g	380g	821g	558g	261g
Warranty	1 year	5 years	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/P623MK8	TINYURL.COM/LET9RDF	TINYURL.COM/KOM2ZT3	TINYURL.COM/QDRNP3P	TINYURL.COM/Q2YT6NV

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Best budget headphones					
	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4 PC ADVISOR RECOMMENDED	5
	RHA MA450i	Sennheiser HD 429	Rock Jaw Alpha Genus	AKG K77	Vibe Slick Zip V3
Price	£39 inc VAT	£45 inc VAT	£41 inc VAT	£25 inc VAT	£12 inc VAT
Website	Rha-audio.com/uk	En-uk.sennheiser.com	Rockjawaudio.com	Uk.akg.com	Vibeaudio.co.uk
Launch date	Nov 14	Jan 11	Jun 14	May 08	Sep 13
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Type	In-ear	Circumaural over-ear	In-ear	Circumaural over-ear	In-ear
Frequency response	16Hz to 22kHz	18Hz to 22kHz	20Hz to 20kHz	18Hz to 20.5kHz	20Hz to 20kHz
Nominal impedance	16 ohms	32 ohms	16 ohms	32 ohms	16 ohms
Sensitivity	103dB	110dB	108dB	112dB	93dB
In-line remote	Yes (3 button)	No	No	No	Yes (1 button)
Mic	Yes	No	No	No	Yes
Extra grommets	Yes	N/A	Yes, and filters	N/A	Yes
Carry case	Yes	No	Yes	No	No
Cable length	1.5m (braided)	3m	1.2m (twisted)	2.5m	1.2m
Weight	14g	218g	11g	190g	21g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/P7W7RVL	TINYURL.COM/ND8TD8O	TINYURL.COM/NNYUFBF	TINYURL.COM/PA8FOX4	TINYURL.COM/QJULK9P

Best headphones					
	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4 PC ADVISOR RECOMMENDED	5 PC ADVISOR RECOMMENDED
	Denon AH-D600	Bose QC20	Denon AH-W150	Bowers & Wilkins P3	RHA MA450i
Price	£229 inc VAT	£259 inc VAT	£59 inc VAT	£169 inc VAT	£39 inc VAT
Website	Denon.co.uk	Bose.co.uk	Denon.co.uk	Bowers-wilkins.co.uk	Rha-audio.com/uk
Launch date	Aug 2012	Jun 13	Aug 12	Jun 12	Nov 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Type	Circumaural over-ear	In-ear	Over-ear wireless buds	On-ear, foldable	In-ear
Frequency response	8Hz to 25kHz	20-21kHz	5Hz to 25kHz	10Hz to 20kHz	16Hz to 22kHz
Nominal impedance	37 ohms	32 ohms	16 ohms	34 ohms	16 ohms
Sensitivity	120dB	105dB	102dB	111dB	103dB
In-line remote	Yes	Yes	Yes	Yes	Yes (3 button)
Mic	No	Yes	Yes	Yes	Yes
Extra grommets	N/A	Yes	Yes	N/A	Yes
Carry case	Yes	Yes	Yes	Yes	Yes
Cable length	3m	1.3m	N/A	1.2m	1.5m (braided)
Weight	250g	44g	23g	132g	14g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NBCFJW6	TINYURL.COM/OEAGFOF	TINYURL.COM/O2CJV3R	TINYURL.COM/PZ07PON	TINYURL.COM/P7W7RVL

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Best power banks					
	1 PC ADVISOR GOLD	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4 PC ADVISOR RECOMMENDED	5
	Zendure A2	Anker Astro Mini	Intocircuit Power Castle	Intocircuit PowerMini	Lumsing 10400mAh
Price	£33 inc VAT	£13 inc VAT	£22 inc VAT	£10 inc VAT	£17 inc VAT
Website	Zendure.com	lanker.com	Hisgadget.com	Hisgadget.com	Lumsing.com
Launch date	May 14	Apr 13	Mar 13	Jul 14	Apr 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Capacity	6000mAh	3200mAh	11200mAh	3000mAh	10400mAh
Input	1x 7.5W Micro-USB	1x 4W Micro-USB	1x 5W Micro-USB	1x 5W Micro-USB	1x 7.5W Micro-USB
Outputs	1x 10.5W USB	1x 5W USB	1x 10.5W USB, 1x 5W USB	1x 5W USB	1x 10.5W USB, 1x 5W USB
Auto-on/-off	Yes	No	Auto-on	No	No
Passthrough charging	Yes	No	Yes	No	No
Status indicator	4 LEDs	No	LCD screen	3 LEDs	4 LEDs
LED flashlight	No	No	Yes	Yes	No
Carry case	Yes	Yes	Yes	Yes	Yes
Dimensions	93x48x23mm	92x23x23mm	110x71x22mm	110x20x20mm	138x59x20mm
Weight	137g	80g	280g	118g	354g
Warranty	1 year	18 months	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NGCNO5F	TINYURL.COM/PZHUHJO	TINYURL.COM/P5M9NKE	TINYURL.COM/KWONE54	TINYURL.COM/Q9DYG5G

Best desktop chargers					
	1 PC ADVISOR RECOMMENDED	2	3	4	5
	iClever USB Travel Charger	Zendure Turbo Charger	Olixar Smart IC Charger	Inateck USB Charger	Lumsing 5-Port Charger
Price	£20 inc VAT	£25 inc VAT	£34 inc VAT	£15 inc VAT	£8 inc VAT
Website	Hisgadget.com	Zendure.com	Mobilefun.co.uk	Inateck.com	Lumsing.com
Launch date	Oct 14	May 14	Feb 15	Feb 14	Apr 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Max output	50W	40W	50W	35W	30W
Outputs:					
USB 1	12W USB	12W USB	12.5W USB	10.5W USB	10W USB
USB 2	12W USB	12W USB	12.5W USB	10.5W USB	10W USB
USB 3	12W USB	12W USB	12.5W USB	5W USB	10W USB
USB 4	12W USB	12W USB	12.5W USB	5W USB	5W USB
USB 5	12W USB	12W USB	12.5W USB	5W USB	5W USB
USB 6	12W USB	N/A	12.5W USB	N/A	N/A
Colours available	Black	Black, white	White	Black	Black
Dimensions	100x69x27mm	97x60x27mm	100x69x26mm	100x55x20mm	136x68x30mm
Weight	180g	166g	189g	340g	422g
Warranty	1 year	1 year	2 years	1 year	1 year
FULL REVIEW	TINYURL.COM/MPA4DWC	TINYURL.COM/NKYNJ7P	TINYURL.COM/OCZXK93	TINYURL.COM/KBXUHF	TINYURL.COM/LK220GY

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MATT EGAN



In defence of BlackBerry

On my desk as I write this, I have the two most recent BlackBerry handsets: the Classic (below left) and the Passport (below right). Neither of these is about to storm our Best smartphones chart. Neither of them is going to restore BlackBerry to its former glories.

The best that BlackBerry can hope for now is for its valuable enterprise software assets to be acquired by a major vendor such as Microsoft, Google or Samsung, with the latter being the favourite due to the two companies' existing relationship.

Don't believe me? Take a look at BlackBerry's most recent set of results. It made a profit, but sales of its handsets fell from 3.4- to 1.6 million. And this in a rapidly expanding smartphone market. No. The future of BlackBerry is not as a handset maker. At least not primarily.

BlackBerrys: not bad

But that is not to say that the BlackBerry Passport or the Classic are bad smartphones. They are not bad products, but nor are they smartphones in the modern sense of the world. Those two most recent BlackBerrys offer something different to everything else on the market. They are not multimedia- and entertainment devices as are Androids, iPhones and Window Phones. BlackBerrys remain almost exclusively communications devices. Portable gadgets for email, SMS, IM and - yes - placing telephone calls.

And at those functions the two newest BlackBerrys excel. The Passport's big square screen and bigger than average physical keyboard make it the perfect portable device for reading and replying to email. It's good even for perusing and amending spreadsheets. Properly. And it's a phone.

The BlackBerry Classic is not as good at either of these things, but makes up for it by being smaller and cheaper. Which is in itself interesting: in portable tech, smaller usually means more expensive. It is entirely in keeping with the BlackBerry handset's productivity chops that the bigger device is more expensive. You are paying for the big screen on which to work, rather than smaller, more powerful components.

It is sad that such products may struggle to survive in a post-BlackBerry world (or at least a world in which BlackBerry is no longer an independent phone maker). Diversity is almost always a good thing. The few people who use BlackBerrys tend

to love them. And there is an argument for having a BlackBerry purely for business communications and productivity.

Several devices to rule them all

I've written before about how great a piece of engineering is the Surface Pro 3, and how little I want to own one. The Surface Pro 3 is a good laptop and an acceptable tablet. It is great at neither. I am happy to have a separate laptop and tablet, as I use them for different things at different times. For the minor inconvenience of not always having a power PC to hand, I am happy to enjoy the better keyboard of the laptop, and the greater portability of my venerable iPad mini.

It's the same with smartphones. I love my LG G3 and it is a fine music player, but I would rather have a separate iPod on which to store all my music than compromise on carrying around only a few banging tunes. Yes, I am that guy.

I am not a guy who wants a BlackBerry, however. Just someone who can see the value of having a work-only device that is great at the things it needs to do.

We'll miss an independent BlackBerry when it goes. But go it will. ☒

“BlackBerrys remain almost exclusively communications devices. Portable gadgets for email, SMS, IM and - yes - placing phone calls”



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DS115j AND DS215j

THE PERFECT DATA STORAGE SOLUTION FOR YOUR HOME

Run your own personal cloud from the comfort and security of your home



POWER-SAVING AND RELIABLE

DS215j features a dual-core CPU, supports up to 12TB of data and consumes less than 14w when active while the DS115j offers a stable storage environment for users with no need for raid, consuming less than 11w when active.

ACCESS ANYWHERE, ANYTIME

Synology NAS' and the intuitive DiskStation Manager (DSM) software allow users to sync and share files among multiple devices, including Windows PC, Mac, Linux, iOS, Android and Windows Phone.

MULTIMEDIA CENTRE

Audio Station, Photo Station, Video Station and Media Server transform your Synology NAS into a centralised multimedia hub.

Where to Buy

amazon.co.uk

The electronics specialist
maplin

Synology apps available on

iOS



Synology's Media
Accolades

